THE IRON AGE

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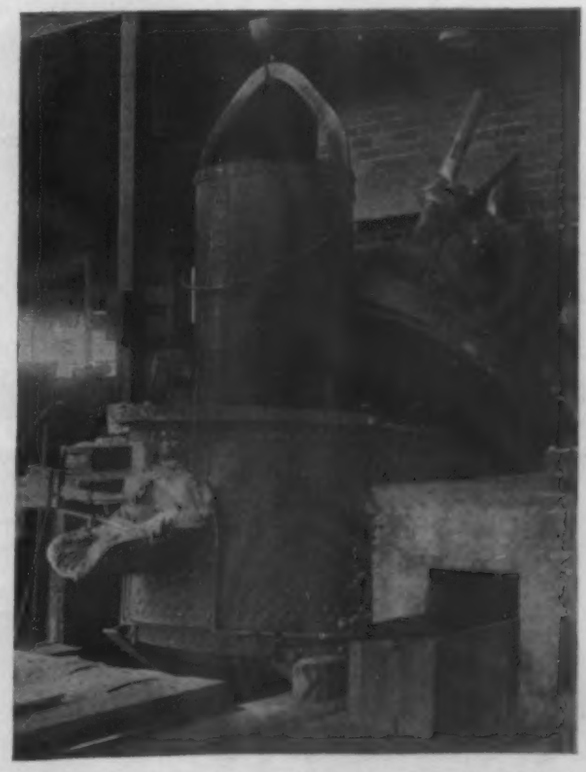
# Savings Result from Pre-Heating

## Castings Before Annealing and Scrap Before Melting Heated in a Toledo Steel Foundry—Sand Reclaiming and Ladle Drying Other Features

THE mechanical reclaiming of foundry sand, the use of electricity for annealing steel castings in an annealer of unique design, the pre-heating of the scrap before it is charged into the electric melting furnace, and the baking of cores electrically are some of the features of the practice of the Industrial Steel Casting Co., Toledo, Ohio. Recent installations include both an electric annealing and an automatically controlled oil-fired annealing furnace. This company makes both carbon steel and alloy steel castings for various commercial uses, but specializes on the lighter railroad castings.

The electric annealing furnace, which is of a new design, is of the car bottom type. It has three chambers—one for pre-heating, one for heating and a third for cooling. The three chambers are not built in a continuous line, connected end to end. Instead, the pre-heating chamber is located at the side of the cooling chamber, and there is an open arch between the two so that the heat from the charge in the cooling chamber is utilized in pre-heating. Heating units are provided only in the heating zone.*



*Scrap Is Pre-heated in a Bucket in a Pit Before Being Charged into the Electric Melting Furnace, Increasing the Melting Capacity About 50 Per Cent. A bucket of pre-heated scrap is being charged into the furnace*

The car bottoms have a loading area of 5 x 9 ft., and are of 5-ton capacity. The cars are moved in and out of the furnace chambers by means of chain conveyors running underneath the furnace floor. Traveling dogs on the chain engage the cars through a slot in the floor between the rails. The chain is motor-driven through sprockets.

Four cars are used in the cycle of operations, one being located in each zone and a fourth outside for loading and unloading. The arrangement of the furnace necessitates two tracks and two conveyor chains, one for the pre-heating chamber and the other for the heating and cooling chambers. After pre-heating, the car passes through the back or discharge end of the pre-heating chamber a short distance to a point where the two tracks come together. Then the conveyor chain on the other track engages the car and moves it in the opposite direction to the heating chamber. This car pushes the car that is in the heating chamber on into the cooling chamber without exposure to the outside air, and the one in the cooling chamber out of the discharge end of that chamber. The car is kept in each chamber 8 hr., making a 24-hr. cycle of operations. It is stated that the castings leave the cooling chamber in practically a fully normalized condition. After removal, they are allowed to stand about 2 hr., when they are cool enough to be readily handled.

The connected load of the furnace is 190 kw. on a 440-volt current. The temperature in the pre-heating zone is 600 to 700 deg. Fahr., and the annealing temperature in the heating zone is from 1550 to 1650 deg. Fahr.

The temperature is controlled by a Leeds & Northrup two-point regulating and recording potentiometer, with recording and controlling instruments located in a room adjoining the furnace. A thermocouple is located in the roof in the heating zone and is connected to the automatic control panel. Another is provided in each car, to indicate when the bottom castings are up to heat. The electric annealing furnace was built by the General Furnace Co. and the heating units and control panel were supplied by the General Electric Co.

The oil-fired annealing furnace is a single-chamber car type furnace of the Tate-Jones design built by the General Furnace Co. This has a chamber 12 ft. long and 6 ft. wide and its capacity is 10 tons. The oil and

*A furnace of this type and operating in this manner was described and illustrated in THE IRON AGE of May 4, 1922, page 1217.

air supply to the burners is automatically controlled by Leeds & Northrup instruments. The control equipment, set for a temperature of 1550 deg. Fahr., controls the heat within plus or minus 10 deg. When the temperature goes above the maximum, the supply of oil and air is shut down but not entirely shut off. When it gets down to the minimum, the full fuel supply is again automatically put on. The temperature recording and controlling instruments are located in the foundry laboratory. The oil-fired furnace is charged once in 24 hr. and the charge is allowed to cool down to 900 deg. Fahr. in the furnace.

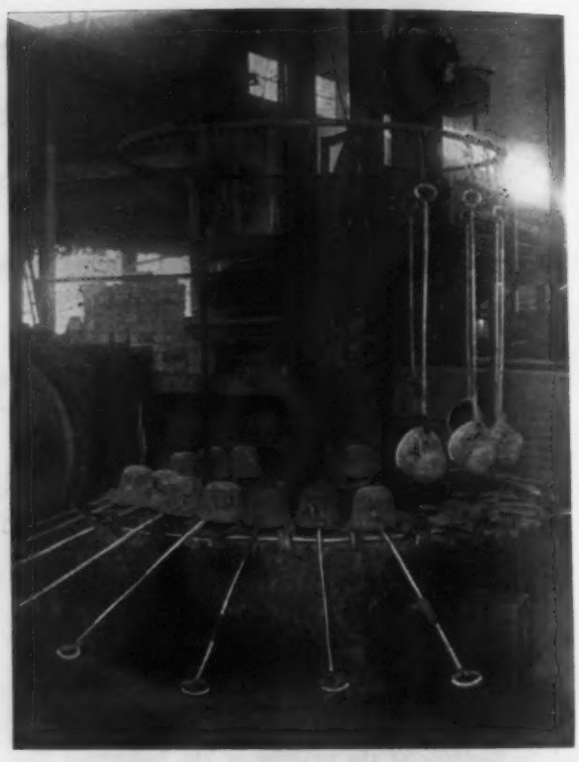
The electric annealing furnace is used only when the plant is running at capacity, as it cannot be operated economically unless there is sufficient tonnage to operate it continuously. The oil-fired furnace is more flexible, in that it can be operated on various sized loads and can be run every day regardless of the size of the load, permitting good service should the customer want quick delivery. When the foundry is running at capacity the oil-fired annealing furnace is held as a spare unit.

### *Pre-Heating the Scrap Before Melting*

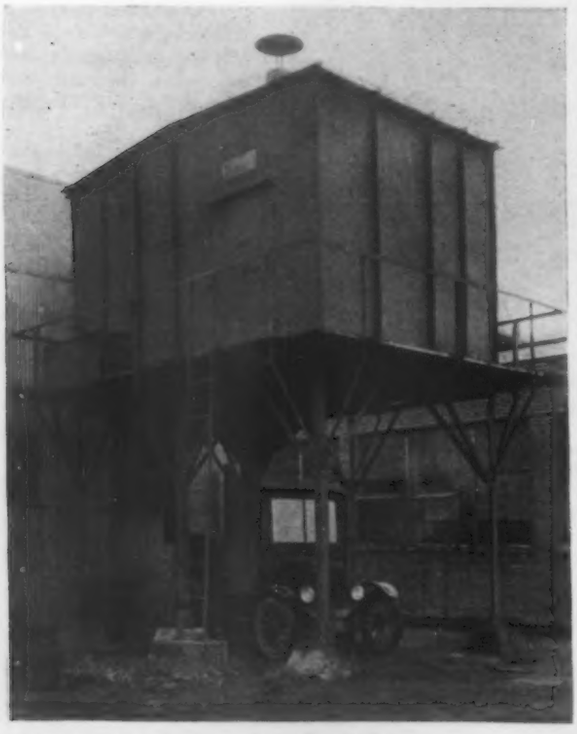
The melting unit is a 2-ton Snyder electric furnace with a tilting-back roof. Scrap, instead of being charged cold into the furnace, is pre-heated in a steel, brick-lined charging bucket of 3½-ton capacity. The empty bucket is put in a pit, 8 ft. deep and 6 ft. in diameter; then a sleeve, 12 in. in diameter, which is a section of steel pipe, is set in the center of the bucket and the bucket filled with scrap. The sleeve is then lifted out, leaving a hole in the center of the bucket. Later a crane swings a combined cover and oil burner over the top of the bucket. The flame is directed down to the bucket through the center of a sleeve on the burner. The charge is brought to a temperature of 1400 to 1500 deg. Fahr. in 60 to 75 min. and at an oil consumption of 13 to 17 gal.

After the furnace is tapped, its roof is tilted, the crane picks up the charging bucket, spots it above the furnace and the bucket is let down so that its bottom extends down a few inches into the furnace. Then the scrap is charged by tripping the bucket bottom, which is in two sections, hinged at the sides.

The pre-heated charge is melted down and the furnace is tapped in 1 hr. 45 min. The pre-heating of the charge saves electric current and it is stated that it has resulted in an increase of about 50 per cent in the capacity of the furnace, which was 13 to 14 tons per day when the furnace was charged with cold scrap but is now 20 tons or over. Removing the furnace top for charging is hard on the furnace lining, as the exposure to the air causes spalling and the lining has to be replaced every five weeks. However, the furnace roof shows good life and has to be relined only twice a year.



*The Ladle Dryer of Special Design Is One of the Convenient Features of the Plant*



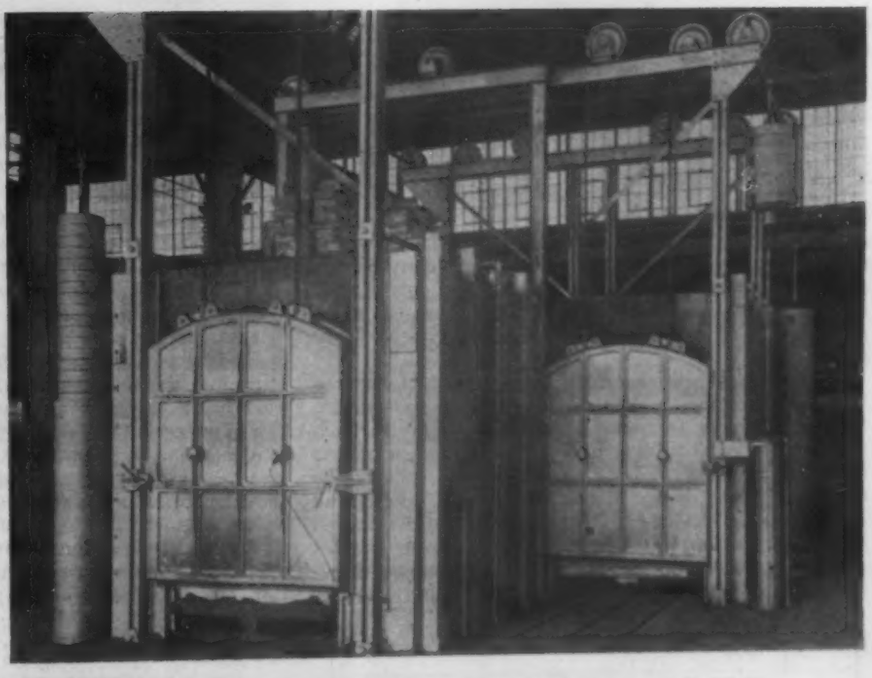
*The Classifier and Dust Arrester Equipment. The portion of the fine sand reclaimed by the classifier is used in making cores*

### *Drying Hand Ladles*

Among the interesting features of the foundry are the facilities recently provided for drying hand ladles. The ladle dryer, which was designed in the plant, is of steel and firebrick construction, 12 ft. in diameter and about 30 in. high. It has an inner and outer steel shell lined 12 in. with firebrick inside the outer shell and lined 8 in. with firebrick outside the inner shell. These shells with their lining form the outside of the firing chamber. The dryer is divided into three compartments and an oil burner for each compartment is located outside of the outer shell, 8 in. from the floor line. The dryer is tangentially fired from these burners. There are 24 portholes on the top of the dryer for that number of ladles, which are set inverted over the holes. The firing chambers are baffled so that a uniform amount of heat is carried up to each porthole. The ladles are not only dried but are brought up to a red heat of from 1600 to 1800 deg. Fahr., this being accomplished in from 15 to 20 min. The same equipment is also used for drying bull ladles. A rack is provided above for hanging hand ladles.

### *Drying Cores with Electricity*

The electric core oven is of the sliding door type built by the F. A. Coleman Co., Cleveland. The connected load is 45 kw. on a 440-volt current. The ribbon heating units are in the bottom of the oven and were supplied by the Westinghouse Electric & Mfg. Co. The oven is controlled with Tycos electric contact temperature control. The oven is set at a temperature of 410 deg. Fahr., and is automatically regulated for plus and minus 5 deg. With this oven it is stated that the foundry is able to use a cheaper mix and to make better



*The Electric Annealing Furnace Has Three Chambers, One for Pre-Heating, One for Heating and a Third for Cooling, the Heat from the Latter Being Utilized in the Pre-Heating Chamber*

*Considerable Saving in Foundry Sand Is Effected by Mechanically Reclaiming Heap Sand. Coarse sand, discharged from the separator at the left, is shoveled into the mixing machine, where new sand and bonding material are added and the reclaimed sand is used for facing sand*

*The Oil-Fired Annealing Furnace with Automatic Temperature Control for Use Particularly on Small Castings*

cores than with fuel-fired ovens and that, because of the good control, it is never troubled with burned cores.

### *Saving Molding Sand by Reclaiming*

A saving of three to four tons of molding sand, reclaimed every day, has been effected by the use of the sand reclaiming system. The saving is about 33 1/3 per cent in the amount of new sand used. The reclaimed sand is used for facing sand. The foundry uses 20 tons of molding sand per day and, before the reclaiming process was adopted, approximately 50 per cent of new sand was added daily. Now only 6 to 7 tons per day are added. On production work the average amount of new sand added is now only 25 to 30 per cent.

The burned heap sand to be reclaimed is dumped through a grating in the floor to a hopper underneath. From the hopper this sand is conveyed by air through an elevating pipe leading to a separator, located above the floor of the foundry. The separator collects the coarse sand and dumps it into a bin beneath, adjoining a sand mixing machine. The remaining sand is carried to a combination classifier and dust arrester located outside of the building. The classifier further separates the material and the fine sand drops into a hopper beneath and a portion of this sand is used in the core room. The dust is collected in the dust arrester and this, with the portion of fine sand not used in making cores, is carted to the dump. The exhaust fan which creates the air suction for the system is located on the clean air side of the dust arrester. The reclaiming equipment has a capacity of 2 tons per hr.

The reclaimed foundry sand is shoveled into the sand mixing machine, where new molding sand and bonding material are added in varying percentages. After mixing, the sand goes back to the foundry floor.

One of the important advantages claimed for the sand reclaiming process, as carried out in this plant, is that there is a uniformity in the facing sand. Guess work is avoided in determining the quality of the heap sand and the molders always know what kind of sand they are getting. Fine sand is entirely eliminated and the sand reclaimed shows a uniform grain size under the screen test. Uniformity in the sand, it is stated, has resulted in improved quality in the castings. In addition to reducing sand cost, there is also a saving in labor, as there is less refuse sand to be hauled to the dump than before the reclaiming methods were adopted. The sand reclaiming equipment was built by the W. W. Sly Mfg. Co., Cleveland.

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# What Individual Castings Cost

## Methods Adopted by a British Iron Foundry in Analyzing Cost of Metal and of Molding—How Overhead Is Included

BY T. SMITH*

THE subject of foundry costs is one of such general interest and importance that, while an appreciable amount both of discussion and literature has centered around it in recent years, it is felt that no apology is needed for describing the methods in vogue at a large English foundry for ascertaining costs of individual castings. The product is mainly castings for locomotive work and hydraulic machinery.

Before entering into detail, it has long been a matter of surprise to the writer, and I venture to say the same applies to many of the readers of THE IRON AGE, that, while many executives will put in elaborate systems to ascertain their costs of machining and erection, they are apparently quite content to value the output of their foundry at an average rate per 100 lb. Why this should be so, it is very difficult to follow, because not infrequently the cost of the castings far outweighs the value of any machining labor subsequently put into them. This was the position up to some six or seven years ago at the particular foundry with which the writer is connected, when a change was decided on.

In seeking a reliable method, we decided first of all to dissect all our costs into three main headings:

1. Molten metal.
2. Wages spent on molding, cores and dressing.
3. Overhead charges.

### *Cost of the Metal and Molding*

Discussing them in the order named, it was realized that to take an all-around figure for metal was incorrect. Our output ranged from the highest grade of cylinders, using the best kind of pig iron with a relatively low proportion of scrap metal, to other items where weight was practically the only consideration.

Enumerated, the factors influencing the metal cost are:

1. Grade of pig iron.
2. Ratio of pig iron to scrap.

In this country we are paying at the present time from 80c. to $1.30 per 100 lb. for pig iron, this latter being the best close-grained material as used for hydraulic cylinders, designed to stand the heaviest pressures. Similarly, according to the type of casting and specification, our ratio of pig iron to scrap put into the cupola may vary from 75 down to 20 per cent.

At one period it was proposed also to take into consideration the effect of material used for headers on the costs but, after investigation, it was decided that the effect was not such as to warrant the additional complication and expense that would be entailed.

In the first place we make use of what is known as the cupola sheet, a replica of which is shown in Fig. 1, and on which are recorded the weight and description both of the metal melted and of the fuel used. Under the heading of molten metal cost, however, there are other items of expenditure, such as the men's time for charging and tapping the cupola, unloading pig iron and scrap and breaking it up ready for use, repairs to the cupola, cleaning and daubing the ladles, cost of power for the blower, etc. Standard order numbers are allocated to each of these items and against which all expenditure is booked.

With a view to debiting each grade of casting with its correct cost, the output is divided into three grades, A, B and C, the deciding factors being the grade and price of pig iron and the relative proportions of pig and scrap used in its manufacture. The precise classification of any individual casting is made by the foundry superintendent and, accordingly, in making up the molten metal cost, a division is made into the three headings as shown by Fig. 2. This gives a representative cost of metal during a recent month for the varying grades of castings. For identification purposes, the pattern number of each casting is prefixed by one of the three letters, A, B or C, indicating the grade and type of metal from which it is to be made.

It is to be noted that, in using any figure for output, it is of course understood that this refers to good castings only, any defective ones being put back into the cupola for remelting. Their weight will be excluded in the second melt, since it will already have been taken care of in the previous charge. We have thus the cost of the metal for each type of casting up to the stage of pouring into the mold, and our next question is the wages spent on molding, core-making and dressing.

For these operations piecework prices are fixed by the superintendent and thus become a definite charge against the particular castings to which they refer. Incidentally each workman, on commencing a new job,

is given a card on which are full details as to the quantity required, pattern number, piecework price, etc., and on which is booked the actual time spent on it. On completion of the job, the cards are returned to the office, first, for his wages to be made up and, secondly, for the details to be entered in the cost records.

### *Overhead Charges*

Overhead charges may be considered as the whole of the remaining expenses pertaining to the running adjustments are made from time to time, but we are satisfied that it helps us to get a truer cost than any other means we have yet hit upon.

The writer has purposely refrained from a discussion of the general subject of overhead expenses since, first, every foundry owner knows perfectly well of what they consist, and, secondly, so much has been written from an academic and non-practical point of view that the mind tends to become befogged with what is, after all, a relatively simple question.

### *Gross Cost of Each Grade*

Apart from making up individual costs, a summary of the gross cost of the total output in each grade is made up each month along the lines indicated by Fig. 3. The individual costs are made up along similar lines and the details in Fig. 4, relating to a bedplate for an electric lighting plant, may be of interest.

The procedure adopted in quoting for new work is first to estimate the weight. From previous records it is ascertained whether similar castings have been

IRON FOUNDRY — DAILY CONSUMPTION

DATE _____

| PIG IRON | | SCRAP | FUEL | | |
|---|---|---|---|---|---|
| BRAND | WEIGHT | METAL | COAL | COKE | LIMESTONE |
| | | | | | |

*Fig. 1 (Above)—Replica of the Cupola Sheet*

*Fig. 2 (At Right)—Molten Metal Cost Sheet for Three Grades of Castings*

MOLTEN METAL COST — MONTH ENDING _____

| GRADE | OUTPUT | PIG IRON | SCRAP | FUEL | POWER | REPAIRS | GENERAL STORES | WAGES | GROSS COST | COST PER 100 LB. |
|---|---|---|---|---|---|---|---|---|---|---|
| | TONS | $ | $ | $ | $ | $ | $ | $ | $ | $ |
| A | 90 | 2300 | 325 | 241 | 84 | 18 | 14 | 198 | 3180 | 1.76 |
| B | 72 | 985 | 360 | 201 | 71 | 15 | 12 | 183 | 1827 | 1.27 |
| C | 61 | 315 | 595 | 162 | 56 | 12 | 11 | 137 | 1288 | 1.05 |

IRON FOUNDRY ACCOUNT FOR MONTH ENDING _____

| GRADE | OUTPUT | MOLTEN METAL COST | DIRECT WAGES | | | TIME TAKEN | OVERHEAD CHARGES | TOTAL COST | COST PER 100 LB. |
|---|---|---|---|---|---|---|---|---|---|
| | | | MOLDING | CORES | DRESSING | | | | |
| | TONS | $ | $ | $ | $ | HOURS | $ | $ | $ |
| A | 90 | 3180 | 1680 | 676 | 271 | 6341 | 2219 | 8026 | 4.46 |
| B | 72 | 1827 | 1263 | 398 | 147 | 4360 | 1526 | 5161 | 3.58 |
| C | 61 | 1288 | 905 | 227 | 92 | 2934 | 1027 | 3539 | 2.90 |

*Fig. 3 (At Left)—Gross Cost of the Total Output of Each Grade for a Month*

IRON FOUNDRY COST RECORD

PATT. No. B61 — DESCRIPTION Bed Plate — DRG. A2384

| ORDER NO. | QUAN. | WEIGHT | MOLTEN METAL COST $ | DIRECT WAGES | | | TOTAL HOURS | OVERHEAD CHARGES $ | TOTAL COST $ | COST PER 100 LB. $ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MOLDING $ | CORES $ | DRESSING $ | | | | |
| 3571 | 1 | 950# | 12.07 | 8.50 | 1.35 | 1.00 | 29 | 10.15 | 33.07 | 3.48 |

*Fig. 4 (At Right)—Details of Cost for Individual Castings, a Bed Plate Being Used as an Example*

of the foundry. Our practice is to total them up each month and divide the sum arrived at by the gross number of hours worked by the men, booking their time directly against productive work. This gives a rate per hour which we debit against each job according to the time spent on it. We consider that the time a job takes in the foundry is the fairest basis of charging overhead, since the majority of the items, such as taxes, insurance, heating, supervision, etc., are fairly constant week by week and appear to us to have little comparison to the weight of the output.

In the months during which the amounts shown in Fig. 2 were expended, our overhead charges amounted to $4,772 and the total number of hours worked, booked on the men's cards against their various jobs, equaled 13,635 hr. We therefore debited the sum of 35c. per hr. against each job according to the time spent on it. This figure is of course watched closely and minor made, and, if so, the wages cost is noted and the price built up with the aid of the current costs and charges. Alternatively the requirement is submitted to the foundry superintendent, who decides the grade and fixes the piecework prices at which it shall be made. From this information the total estimated cost is arrived at, as well as a quotation.

With reference to patterns, in the normal course, the whole of the cost of the pattern shop is charged against the foundry and included in the overhead charges. Exceptions are occasionally made in the case of orders requiring intricate and expensive patterns, a separate cost being recorded and spread over the number of castings ordered.

In conclusion, the methods outlined herein have proved quite satisfactory in service and, as a result, we are able to submit quotations with a much greater degree of reliance than hitherto.

# Alloy Iron Made Electrically

## Castings Containing Nickel and Chromium Have Unusual Properties—Longer Life of Alloy Iron Ingot Molds

ONE of the most interesting fields for future metallurgical development is in gray iron castings made in electric furnaces. Rapid progress in many sections of the country is being made in this line with some highly important results. In a small foundry in Western Pennsylvania, a group of zealous workers is gradually developing a line of electric gray iron castings which possess many features of interest.

Primarily engaged in making ingot molds on a large scale for many of the leading steel-making companies of the country, the president and directors of the Vulcan Mold & Iron Co., at Latrobe, Pa., leased a small foundry near their principal plant, with a view to developing some line of iron castings. The plant had been used for making pipe fittings. After canvassing the field, it was decided to install an electric furnace for producing special products in gray iron.

The regular product of the company is ingot molds designed chiefly for the manufacture of high-grade soft steels, alloy steels, and tool steels, which consist of both split molds and solid molds of the latest type. During some research work on various grades of cast iron to determine their suitability for ingot molds, alloy cast iron was made in a crucible, melted in a resistance type electric furnace. The unusual properties of this iron were at once noted and it was decided to go ahead with an experimental study of this material. It did not take long to determine that there was a considerable field for this type of product which led to the leasing of the nearby foundry, mentioned above.

The foundry was remodeled and a considerable amount of new equipment was added which included traveling crane and monorail systems, modern molding and core-making machinery, and other equipment designed for the production of these special castings from one pound to one ton in weight. The most important addition, of course, was the installation of a ½-ton Moore electric furnace, particularly designed for melting cast iron and having a complete automatic control system. A cupola is available, also, for making equipment for the No. 1 plant and other ordinary gray iron products.

### *Some of the Special Castings Made*

The electric furnace has a capacity of 10 tons of alloy cast iron and the cupola about 20 tons of gray iron castings per day. This plant now produces all of the split ingot molds which the company manufactures, made of both cupola iron and alloy cast iron. The chief aim, however, is the development of electric furnace alloy cast iron and already a large number of castings have been placed on the market. These include die blocks, hammer dies, automobile parts such as pistons, cylinder blocks, special molds for the glass industry, heat-resisting iron for furnaces and ovens, and wear-resisting castings such as pipe balls and piercing points. In all cases where comparative results were obtained, this alloy iron has proved itself superior to the ordinary cupola iron.

The experience of the company in reaching out into this field has been an interesting one. The first small castings which were made were the horns for loud speakers for a prominent maker of radio apparatus. These are, of course, thin-walled castings. Unusual success was at once attained, the surprising feature being that they were made from Bessemer iron, electrically melted. Thus, the theory that high phosphorus is essential to the pouring of thin sections was exploded. It is understood that this is the first time that such castings had been made from Bessemer iron. Incidental to the production of these castings was the use of a special apparatus by which the cores for the horns were made by blowing sand into a core box.

Another casting of special interest being made from electrically melted and treated Bessemer iron is a small air-cooled cylinder of specially thin section. Many hundreds of these are being successfully produced. A feature is their particular soundness, density and close-grained structure with ready machinability.

### *Alloys Change the Structure*

The company has had some interesting experience in making alloy castings by this process. Various percentages of chromium and nickel, either alone or in combination, have been incorporated in certain castings, and their marked properties have made them desirable. As is well known, the presence of these alloying metals in gray iron decidedly changes the structure of the iron, imparting both increased strength and hardness, and yet rendering the machinability better, if anything.

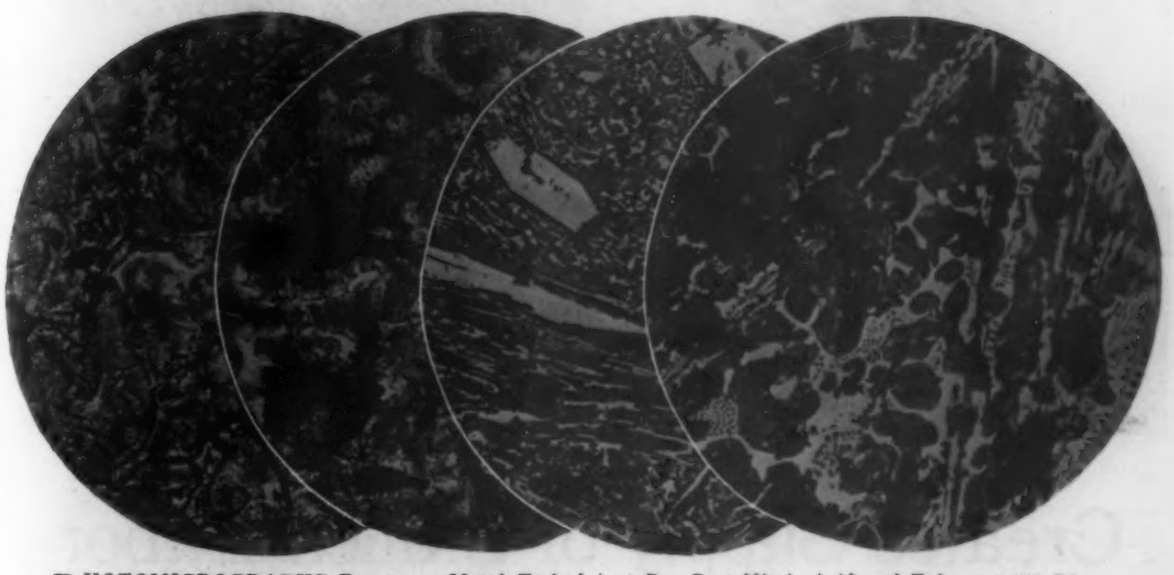
In the manufacture of this alloy iron, the Vulcan Mold & Iron Co. has found it highly advisable to use an electric furnace. A large recovery of the alloys is made possible by this method, due to the high temperatures and to the absence of oxidation. It was also found that control of composition could be made surer and that, when the proper analysis for a given casting was found, it could be readily duplicated. The very desirable condition of low sulphur content is also attained. Alloy iron of very low carbon content, almost on the border line between iron and steel, has been made with comparative ease. Melting takes place in the usual manner, the charge generally consisting of pig iron and steel scrap, the alloys being added just before tapping the heat.

A number of unusual properties have been produced by varying the amount of alloys together with changes in the percentages of the ordinary constituents of cast iron. In castings of very small sections, it is possible to produce an iron having a dense, close-grained structure, pearlitic in character, which can be machined readily at a much higher Brinell hardness than is possible with ordinary gray iron. This is done by the elimination of hard spots, chilled corners, and by having the graphite more evenly distributed and in a more finely divided state. Castings of large sections have been made with only a slight variation in hardness from outside to center and machinable at normal speeds with Brinell hardnesses of over 300. These castings are very strong, tough, and resistant to wear. Where high strength is desirable, castings have been made with tensile strength on a standard A.S.T.M. test bar of over 40,000 lb. per sq. in., and a transverse strength of 4550 lb.

Practical experiments on heat-resisting alloy cast iron made with high percentages of alloys have shown a freedom from excessive oxidation at high temperatures. An experiment conducted under similar conditions of temperature and time on pieces of alloy iron and ordinary cupola iron showed an oxidation loss of 2 per cent on the alloy iron and 30 per cent on the cupola iron.

Various customers in various fields are trying out these types with satisfaction and success. There appears to be a large demand for such castings, especially when made under the conditions obtaining in an electric furnace, because of the uniformity in control of the analysis, and the better recovery and thorough

**Structures of Typical Alloy Iron Castings**



*PHOTOMICROGRAPHS Represent Metal Etched in 4 Per Cent Nitric Acid and Taken at 150 Diameters.*

*From left to right they are: Alloy iron die blocks, hammer dies, etc., machineable at Brinell 302; tensile strength 38,750 lb. per sq. in. Alloy iron pistons and cylinders, rapidly machineable at Brinell 196. Heat-resisting alloy iron for furnaces, ovens, etc. Wear-resisting alloy iron, strong and hard.*

mixing of the alloys with the iron, made possible by the higher temperatures.

### *Ingot Molds of Alloy Iron*

The company has had some interesting experience with the production of split ingot molds made of electric furnace gray iron, both plain and alloy. A number of these was made and sent to a few regular customers without their being informed of the different character of the metal. A canvass of the field, after a reasonable time, resulted in many expressions of approval of the decidedly improved character and life of certain molds in use. It developed that these special ones were superior to the ordinary cupola made product.

From this brief recital of the experience of one company, just entering this field, it is evident that the surface has only been scratched. The refining possibilities of the electric furnace is one factor in producing better castings, the high temperature possible for thin sections is another. Then the radically different metal obtainable, under the foregoing favorable conditions, by the addition of alloys, is the basis for the prophecy that the gray iron industry, because of the uses to which its product may be put, may undergo decided changes in the next few years.

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## Shortcomings of Technical Education

Much difference of opinion appears in some of the preliminary reports of the Society for the Promotion of Engineering Education, in connection with its investigation of the present status of its field. The statement is made that we have concentrated most of our facilities in colleges designed primarily to fit men for planning, investigatory and advisory service of professional grade. Craftsmanship, trade training, apprenticeship and foreman training are provided for but meagerly. Training for the lesser technical positions, not permanently attractive for college men, is wholly inadequate. For the operating type of activity little distinctive training is given.

Multiplication of colleges at the weakest end of the scale is taking place. The whole situation threatens the integrity of the engineering degree and overloads the colleges with men for whom their distinctive type of training is inappropriate.

### What Is Needed Now

Most immediate of the needs of the moment is to provide for large numbers of young men a briefer, more practical, more intensive training than that of an engineering college. It must be a training broader than that of a trade school and quite distinct from that of an academic junior college. Of the two types of young men to be provided for in such schools, one already is employed in industry but is desirous of giving a limited time to intensive training, to facilitate his progress in chosen lines of activity. The other is the secondary school graduate who does not desire an arduous theoretical preparation, but seeks to enter the industrial field through its junior technical or supervisory service and work his way up.

Graduates of a small group of technical institutions now doing excellent work in this field are able to enter active life at a fairly early age. They have assured earning power, with ample time for thorough grounding in experience, and with willingness to accept the regime and environment of operating organizations. They rise to positions of considerable responsibility and in some cases achieve distinguished success, though more often in the operating field than on the professional side.

### Topics to Be Strengthened

General consensus of opinion was had in a questionnaire, to the effect that economics is the most useful of the cultural subjects not now adequately covered. Much evidence points to the conclusion that neither the type nor the extent of economic training in engineering curricula is commensurate with the vital importance of the economic phases of engineering work. Only after being out of college for several years does the graduate acquire sufficient familiarity with economic thought to be able to make use of it. Specific instruction in administration and management problems is regarded as highly desirable, whereas foreign languages as such are considered of comparatively small value to the engineering student.

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A convention and show of road builders will be held in Chicago, Jan. 10-14, inclusive, 1927. Charles M. Upham, Raleigh, N. C., is business director.

# Creates Supply of Skilled Labor

## Chicago Foundry Conducts Apprenticeship Course in Molding, Pattern-Making and Tool-Making—Both Class Room Instruction and Shop Training Provided

BY ROGERS A. FISKE*

FORMERLY a large share of our skilled workers came from the industrial centers of Europe. The war and, later, restriction of immigration cut short this supply, and in the meantime our industries have continued to expand and the demand for skilled labor has grown from year to year. The manufacturer who, in 1914, had in his employ highly skilled and loyal workers is fortunate if he still has many of them in his shop. These men, however, are growing old, and the time is fast approaching when age will strike them down.

These were among the considerations which brought apprenticeship training forcibly to the attention of the Pettibone Mulliken Co., 140 South Dearborn Street, Chicago, manufacturer of frogs, switches and crossing material, and operator of a manganese steel foundry. Early in 1924 a student training course was put into operation, following a thorough study of other courses then in existence. The purpose then, as it is today, was to create a source of skilled labor. The training course is directly under the supervision of G. E. Bergstrom, employment and personnel manager. A. M. Cornell, works manager, has general supervision over the course, and E. W. Powell, chief engineer for the company, plays an active part in its operation.

The course is conducted independently of the public school system, mainly for the reason that none of the Chicago manual training schools is located in the neighborhood of the plant. Although a high school education is not a prerequisite for admission to the course, it is considered highly desirable. In fact, every effort is made to bring to the attention of high school students the fact that the training course is available to those boys who are mechanically inclined. This is accomplished by visits paid to the various high schools in the city by Mr. Bergstrom, at which time he addresses the boys and points out to them the advantages of further education and training by a company which offers them an opportunity to learn a trade. Invitations are extended to high school students to visit

*Western Editor, THE IRON AGE, Chicago.

*Two Foundry Apprentices in Their Second Year Preparing a Floor Mold for a Commercial Casting*

the plant, and many do so. Another source of recruits is the sons and relatives of men who are already employed in the shop.

### No Effort Made to "Sell" Course

Application for enrollment in the student training course must be made in person, and the applicant must be not less than 17 years of age. He must also be able to prove to the company's satisfaction that he is honest, of good behavior, physically sound and good moral character. A boy, upon making application, is examined to obtain a general idea of his turn of mind. He is then taken into the shop, where the various phases of the work are explained to him. In many cases parents or guardians accompany the boys. No effort is made to "sell" the course. In fact, just the opposite is true; in the foundry it is pointed out that the work is dirty and often strenuous. During his first visit to the shop the prospective student's attitude is closely watched, and if, after further questioning, he still shows interest in the course, he is placed on probationary work for a period of from three to six months.

If he has shown the proper attitude toward his work and the ability to make progress in it, the student may, at the end of three months, together with his parents or guardian, execute a student mechanic's course agreement with the Pottibone Mulliken Co. For students who are slow in grasping the fundamentals of the course the probationary period may be extended to six months.

Upon entering the course the student is given a physical examination, and this is repeated at intervals in accordance with the rules which govern the other men in the shop. The student is always started in the department for which he expresses a preference.

The agreement, which must be signed by the student at the end of his probationary period, may be seen by him at any time upon his request. This, although in reality a contract, binds only the company, inasmuch as the attitude has been taken that if at any time a student becomes dissatisfied, it is better to let him withdraw and leave the service rather than to make any effort to force him to discharge his obligation. The agreement, which is signed by the works management, the student and his parents or guardian, states that the student accepts the offer of the company to afford him the opportunity to learn a trade. The student, in turn, promises to promote the interests of his employer during his period of apprenticeship. He also agrees to pursue the prescribed course of instruction and to do a reasonable amount of home study. The employer promises adequately to train and instruct him in the principal operations of his chosen trade and also to pay him wages specified under the terms of apprenticeship, which are attached to the contract. The agreement is in force during the number of years required for the course, including the probationary period of from three to six months. It also specifically states the number of hours the apprentice must work, not including the time devoted to home study.

*The Apprentice Shown Above, Who Has Completed One and a Half Years of His Course, Is Able to Make Practically Any Pattern Required in the Foundry*

*A Definite Schedule of Work Is Established for Each Type of Machine to Which the Apprentice Is Assigned*

### Students Required to Make Up Lost Time

The terms of apprenticeship recognize that time may be lost by the apprentice as a result of serious illness or a decrease in working hours or entire suspension of work dictated by the state of business. At the discretion of the employer, the student may be required to make up any part of, or all, lost time before being permitted to enter the next stage of training. Good deportment, attention and earnest effort are demanded of the student, and his work during each division or "period" of the course must be up to the company's standard. The agreement also provides that the student shall be subject to shop rules in force at the time of commencing the apprenticeship and to any additional regulations which may be adopted from time to time. A student may be discharged from the company's employ for unsatisfactory work, incompetency, improper conduct within or without the shop, social disease, indifference to shop rules and regulations, or insubordination.

A student who has been suspended on account of business conditions has the option of resuming train-

ing before any additional students are enrolled, but to obtain this preference he must report at once when notified by the company that a vacancy exists. Such tools as are required by the student for his personal use in his chosen trade are supplied by the company at cost. On the company's regular pay days the student receives wages for the actual hours of service, including time spent in the classroom. His wages are computed on an established basis for the training course, which is subject to any general wage adjustment during the apprenticeship period.

### Apprentices Are Given Vacations

The students have the right to terminate the agreement with the company for personal reasons. When due proof of such reasons is submitted, the company will furnish a statement cancelling the contract without stigma to the student. At the completion of the course a cash bonus of $100 is paid to the student, in addition to his regular wages, as a reward for the faithful discharge of his obligations. All students who, during their respective terms, have been in the service of the company for a period of one year are entitled to a vacation of one week with pay according to the period rate. A student is allowed 14 days' leave per annum for sickness. Should the student be absent for a longer period, he must serve the additional time before he is permitted to enter his next period. In the event that a student is transferred from a day-rate department to one on a piece-work basis, he is paid the full piece-rate schedule accorded to other employees doing the same class of work. He is guaranteed, however, a minimum wage equal to the hourly rate set for the period in which he was engaged at the time of the transfer.

### Three Courses Are Now Available

The present apprenticeship training program embraces three courses, one of three years for student molders, one of four years for student pattern-makers and another of four years for student tool-makers. Plans are now under way to add a course in blacksmithing and forging. The course in molding is scheduled as follows:

| | |
|---|---|
| Clerical work | 3 weeks |
| Making small cores | 12 weeks |
| Making large cores | 12 weeks |
| Machine molding | 3 weeks |
| Bench molding | 12 weeks |
| Electric furnace department | 6 weeks |
| Annealing and cleaning | 4 weeks |
| Dry floor | 8 weeks |
| Helping molder | 6 weeks |
| Floor molding | 44 weeks |
| Manganese department | 3 weeks |
| Floor molding, gray iron department | 29 weeks |
| Lectures, mechanical drawing and mathematics | 10 weeks |
| Vacation | 3 weeks |

The pattern-makers' course is as follows:

| | |
|---|---|
| Helping: shellacking, stripping and turning core prints and small patterns | 44 weeks |
| Core room work | 4 weeks |
| Foundry floor work | 23 weeks |
| Pattern-making | 113 weeks |
| Metal pattern-making | 8 weeks |
| Mathematics, mechanical drawing and lectures | 12 weeks |
| Vacation | 4 weeks |

The tool-makers' course is scheduled as follows:

| | |
|---|---|
| Tool crib, hack saw and band saw | 6 weeks |
| Switch stand drill press | 8 weeks |
| Tool room drill press | 4 weeks |
| Lathes | 26 weeks |
| Boring mill | 23 weeks |
| Drilling machine | 21 weeks |
| Shaper | 12 weeks |
| Planer | 21 weeks |
| Tool-grinding | 9 weeks |
| Heat treating | 8 weeks |
| Manganese-grinding | 10 weeks |
| Bench and floor work | 26 weeks |
| Planers in rail shop | 4 weeks |
| Keller die sinker | 6 weeks |
| Welding and cutting | 8 weeks |
| Mathematics, mechanical drawing and lectures | 12 weeks |
| Vacation | 4 weeks |

Those who planned the courses did not forget the value of lectures and instruction in mechanical drawing and mathematics while the student is learning his trade. Classes are held three hours each week, one hour being devoted to mechanical drawing, one hour to mathematics and one hour to lectures. Standard text books are used.

The instruction in mathematics and mechanical drawing is under the supervision of the engineering department. The mathematics does not go beyond ordinary shop trigonometry, mensuration and geometry. The primary purpose of the mechanical drawing course is to give the boys a clear understanding of blue print reading. It is not intended to make draftsmen of the students. The lectures are given principally by the foremen of departments in which the apprentices are working. In the lectures, which might better be described as "talks," the foremen explain practical solutions to shop problems and point out ways in which the students can improve the quality and quantity of their work.

### Compensation of Students Changes Every Six Months

The rate of compensation for students is shown in the following tabulation:

| | Student Molders | Student Pattern-Makers and Student Tool-Makers |
|---|---|---|
| First period of six months | 40c. per hr. | 25c. per hr. |
| Second period of six months | 45c. per hr. | 30c. per hr. |
| Third period of six months | 50c. per hr. | 35c. per hr. |
| Fourth period of six months | 55c. per hr. | 40c. per hr. |
| Fifth period of six months | 62½c. per hr. | 45c. per hr. |
| Sixth period of six months | 70c. per hr. | 50c. per hr. |
| Seventh period of six months | | 55c. per hr. |
| Eighth period of six months | | 60c. per hr. |

When the student enters a department he is put directly under the supervision of the man in charge, who is responsible for his safety and progress in the department and is also expected to make an effort to guide his personal habits. At stated intervals lectures are given to the students on general business methods, particular attention being given to the organization of the Pettibone Mulliken Co. and the standards it has set for the quality of its products. All through the apprenticeship course the employment and personnel manager keeps in touch with the parents or guardians of the boys by making personal calls at their homes. Consequently he is able, in most cases, to keep a close check upon the boys when they are absent from the shop or the class room.

### Make Inspection Trips to Other Plants

Visits to other manufacturing plants are arranged so that the students will not become narrow as a result of knowing only the practices in the shop in which they are receiving their training. Within a given time after an inspection trip each student is required to prepare a written report on what he has seen and learned. This is graded, and the student advised of his standing. Throughout the course, weekly reports on class room and shop work are sent to the parents or guardians. No effort is made to stimulate competition by posting grades so that the students may know the standing of others taking the course.

At the completion of his course the student is given a diploma. This is neatly engraved on a good grade of parchment, worthy of display and in keeping with the graduate's warranted pride in what he has achieved. The diplomas are signed by the foreman of the department in which the student has been an apprentice, and also by the works manager, the chief engineer and the employment and personnel manager.

It has been found that some boys who take a course have had previous experience, and it has been the practice in the past to give them credit for work which they have already done, thereby reducing the period of apprenticeship. Although this practice seems unavoidable in some instances, it is not favored by the management.

Obviously every boy entering the course cannot become a department foreman or a works manager. The students who are fitted for higher positions are quickly recognized, and their progress is watched closely. The other boys are carefully supervised with the idea of developing them into first-class mechanics of the type that can be relied upon for accuracy, quality of workmanship and a long period of faithful service to the company. With this latter point in mind, it is sometimes found necessary to extend the training

(*Concluded on page* 823)

# Foundrymen to Meet in Detroit

## Many Exhibitors at Annual Meeting of American Foundrymen's Association, Sept. 27 to Oct. 1. International Congress a Feature

A LARGE convention and exhibition of American foundrymen is always an important event in itself, but this year the prestige will be enhanced by the convening at the same time of many foundrymen and metallurgists from several European countries.

The thirtieth annual convention and exhibition of the American Foundrymen's Association and the second international foundrymen's congress will meet simultaneously in Detroit the week of Sept. 27. Preparations are nearly completed for an event which promises to be unique and epochal in American foundry history.

A technical program of 24 sessions, covering every field of foundry activity, has been prepared. At many of these, some of the prominent foreign metallurgists will present papers and discuss topics. The American contributions to the program will fully sustain the reputation of former occasions. The exhibition, always a feature each year, will be the largest ever held. In the spacious buildings of the State Fair Grounds adequate space will be available.

On the following pages will be found a list of the exhibitors and what they will offer. A new departure is the reproduction of photographs of many of the representatives of the leading companies. The technical program was published in THE IRON AGE, July 15.

## Exhibitors at Foundrymen's Convention, Products They Are Showing and Representatives Attending

### A

ADAMS CO., Dubuque, Iowa. Booths 423 and 425. 10 in. x 32 in. Adams jolt squeezer, 16 in x 42 in. Adams jolt squeezer (shown for the first time), Adams pneumatic sand riddle, Adams cherry snap flasks, Adams steel jackets and miscellaneous equipment. Represented by: Lester Demkier and W. J. Spensley.

ADVANCE MILLING CO., Chicago. Booth 19. Core binder and cores. Represented by: A. W. Hicks and D. T. McGrory.

AGNEW ELECTRIC WELDING CO., INC., Milford, Mich. Electric welding apparatus and equipment.

AIR REDUCTION SALES CO., New York. Booths 224 and 226. Airco 99.5 per cent pure oxygen,

C. D. GIBSON
Detroit District Manager, Air Reduction Sales Co., New York

H. KEMPNER
Sales Manager, Lo-Hed Hoist Division, American Engineering Co., Philadelphia

H. P. HALEY
Vice-President in charge of Sales American Foundry Equipment Co. Mishawaka, Ind.

N. L. NANKEY
Proprietor, American Vent Wax Co. Lockport, N. Y.

Airco acetylene in cylinders, Airco-Davis-Bournonville welding and cutting torches, regulators and supplies, Airco-Davis-Bournonville No. 1-A Radiagraph for oxyacetylene machine cutting (in operation), Airco-Davis-Bournonville oxygen discharge manifold and demonstrations of cutting on steel castings. Represented by: G. Van Alstyne, advertising department; C. D'W Gibson, Detroit district manager; Fred Bowers, John Cummings and LeRoy Edwards, industrial engineering department; L. P. Naylor, sales representative.

AJAX ELECTROTHERMIC CORPORATION, Trenton, N. J. Booth 127. 800-lb. non-ferrous metal metal melting furnace (shown for the first time) and 175-lb., 30-lb. and 15-lb. ferrous or non-ferrous metal melting furnaces. Represented by: G. H. Clamer, president; E. F. Northrup, vice-president and technical adviser; Dudley Willcox, secretary and treasurer.

AJAX METAL CO., Philadelphia. Booths 123-126. Ajax brass and bronze ingot metals and castings, mode therefrom. Ajax Bull Bearing alloy, Ajax-Wyatt electric furnace. Represented by: G. H. Clamer, president and general manager; W. J. Coane, vice-president and sales manager; Frank M. Willeson, New England and New York State representative; Zeno D. Barns, Ohio and Michigan State representative; Henry Gieseke and William Adams, representatives of Ajax-Wyatt furnaces.

ALBANY SAND & SUPPLY CO., Albany, N. Y. Booths 44 and 46. Jersey fire sand, French sand (brass), Jersey fire clay, Windsor Locks sand, dry blast sand, sea coal facing, core compound and foundry supplies.

ALLEN AIR TURBINE VENTILATOR CO., Detroit. Booth 190. Exhausting equipment produced from copper and standard equipment in regular and special finishes. Represented by: Perry F. Kimball, president and general manager; L. P. Halleck, engineer; Hugh T. Wreaks and C. B. Brown, salesmen.

ALLOYS & PRODUCTS, INC., New York. Booth 199. Special alloys and novelties. Represented by: Gilbert T. Mason; John A. Fletcher and Guilford G. Kingsbury, sales department; representatives of technical and advisory staff.

AMERICAN BRAKE SHOE & FOUNDRY CO., Chicago. Booth 373. Annealing pots and plates and stools for annealing oven use.

AMERICAN ELECTRIC MOTOR CO., Milwaukee. Booths 181-183. Heavy duty snag grinders and ball bearing enclosed ventilated induction motors. Represented by: Deane S. Holt, general sales manager; A. A. Hess, manager grinding and polishing division; Walter H. Fenslau, Detroit distributer; J. Guy Griffith, Pittsburgh distributer; L. A. Humason, Chicago distributer.

AMERICAN ENGINEERING CO., Philadelphia. Booths 261-265. Lo-Hed electric hoists, both alternating current and direct current, with foundry control, including plain trolley, hand-geared trolley and motor trolley hoists. Represented by: H. Kempner, sales manager Lo-Hed hoist division; A. E. Martell, sales engineer; C. W. Schroeder.

AMERICAN FOUNDRY EQUIPMENT CO., Mishawaka, Ind. Booths 244-258 and 285-299. Four models sand cutting machines (one shown for first time), sand blast equipment, screen type dust arrester, hammer core machine (shown for the first time) and American aluminum strip flasks. Represented by: Verne E. Minich, president; Fred Graf, Jr., vice-president in charge of manufacturing; Hutton H. Haley, vice-president in charge of sales; C. D. Steinmeier, assistant works manager; F. A. Smith; L. D. Pelk and H. R. Bahnke, engineers; J. D. Alexander; J. E. Sweet, E. J. Turnbull, James Rigby, Jr., C. L. Benham and David Logan.

AMERICAN STEEL ABRASIVES CO., Galion, Ohio. Booth 351. Samples of American Eversharp steel grit and American standardized steel shot, sample castings and forgings showing results obtained through use of metal abrasives in sandblasting apparatus. Represented by: S. D. Layton, vice-president and general manager; F. A. Matthew, sales representative.

AMERICAN VENT WAX CO., Lockport, N. Y. Booth 13. Vent wax for venting cores and cores in which American Brand vent wax has been used. Represented by: Nelson L. Nankey, proprietor.

AMES SHOVEL & TOOL CO., Boston. Booth 372. Molders' shovels. Genuine Oliver Ames alloy treated molders' shovel shown for the first time. Represented by: Edwin T. Nipher, manager Wright Shovel Co.; Walter H. Jenks, assistant to president Ames Shovel & Tool Co.

ARCADE MFG. CO., Freeport, Ill. Booth 456-462. Piston molding machines, standard molding machines and pouring equipment; jolt squeezer heap straddler shown for the first time. Represented by: L. L. Munn, vice-president; B. C. Trueblood, treasurer; Henry Tscherning, chief engineer; Mentor Wheat, August Christen, R. E. Turnbull, Herman Kasten, Carl Falk and G. D. Wolfley, sales department.

ASBURY GRAPHITE MILLS, Asbury, N. J. Booth 61. Plumbago and graphite, crude and refined and demonstration of different grades of foundry facing. Represented by: H. M. Riddle, Jr., treasurer and general manager; Jonethan Bartley, vice-president; Walter Field, sales manager. E. C. ATKINS & CO., Indianapolis. Booth 377. Metal cutting machines and blades. Atkins silver steel hand hacksaw blades shown for the first time. Represented by: G. N. Haug, W. F. Juppenlatz, L. L. Okey, E. S. Norvell, W. R. Chapin and S. M. Perrigo.

AUSTIN CO., Cleveland. Booths 25-27. Photographs, layouts and blueprints illustrating complete foundries with modern equipment. Represented by: G. A. Bryant, vice-president; H. E. Stitt, chief engineer; O. D. Conover, foundry specialist; A. F. Plant, Detroit sales manager; H. L. Cornelison, Cleveland sales manager; E. E. Scott, foundry engineer.

AUTOMATIC TRANSPORTATION CO., INC., Buffalo. Booths 163 and 164. Storage battery electric industrial trucks and tractors. Represented by: J. A. Gordon, Detroit representative; R. J. Mulholland, assistant vice-president.

L. L. MUNN
Vice-President Arcade Mfg. Co. Freeport, Ill.

H. M. RIDDLE, Jr.
Treasurer & General Manager
Asbury Graphite Mills
Asbury, N. J.

E. S. NORVELL
Manager Cutting Department
E. C. Atkins & Co
Indianapolis

O. D. CONOVER
Foundry Engineer
Austin Co., Cleveland

R. J. MULHOLLAND
Assistant Vice-President, Automatic Transportation Co., Inc., Buffalo, N. Y.

FRANZ K. AXMANN, Maschinenbau-Anstalt, Koln-Ehrenfeld, Germany. Booths 331-334. Impeller type sand preparing and transporting machine in process of preparing sand and shooting it by impeller action to fill a sand hopper; and the Axmann Duplex Prosoma, a sand-slinger type molding machine in connection with sand preparing and transporting unit.

AYERS MINERAL CO., Zanesville, Ohio. Booths 23 and 24. Fire clay.

## B

BAKER-RAULANG CO., Cleveland. Booths 335 and 336. Baker electric locomotive type crane, Baker electric malleable pot handler (shown for the first time) and Baker elevating truck. Represented by: D. L. Darnell, assistant general sales manager; A. J. Gates, Detroit; H. B. Greig, field engineer; R. E. Willis and D. C. Parry.

C. O. BARTLETT & SNOW CO., Cleveland. Booths 278 and 280. Sand mixing equipment and sand blending machine (shown for the first time). Represented by: H. L. McKinnon, secretary; H. S. Hersey, vice-president and general manager; S. Gertz, sales manager; M. E. First, chief engineer; H. C. Orr, engineer.

H. L. BAUMGARDNER CORPORATION, Chicago. Booths, 413, 466, 468 and 470. Hines tapered slip flask (shown for the first time) and core oils. Represented by: H. L. Baumgardner, president; H. A. Whiting, J. Purvis, E. Tierney, Fred Hamel, W. Ford, B. Y. Leslie, C. Miller, J. Hines, F. Snyder and J. B. Skelly.

BEARDSLEY & PIPER CO., Chicago. Booths 418-428. Sandslingers. Represented by: E. O. Beardsley, president; W. F. Piper, secretary; John S. Sammons, sales manager; C. H. Ellis, E. L. Mitchell, H. G. Schlichter, Edward O'Connor, Peter Stefan, Harold Lind, Robert R. Snow and A. L. Miller, sales department.

BELLEVUE INDUSTRIAL FURNACE CO., Detroit. Booth 99. Aluminum and brass melting furnaces, tilting type. Represented by: Walter E. Hinz, president; L. J. Raymo, sales manager; E. O. Hinz, treasurer.

BERKSHIRE MFG. CO., Cleveland. Booth 283. Plain air squeeze molding machine, jolt squeeze molding machine, jolt squeeze stripping plate molding machine, air squeeze pattern draw molding machine, vibrators, flasks, etc. Represented by: H. F. Henriques, president; Gordon F. York, vice-president; G. L. Cannon, secretary; Charles J. Skeffington, representative.

BETHLEHEM STEEL CO., INC., Bethlehem, Pa. Booths 50 and 52. Mayari iron and products made therefrom. Represented by: D. A. Barkley, pig iron sales agent; H. P. Kreulin, F. E. Fisher and Robert MacDonald, foundry experts; George A. Richardson, manager technical publicity department; J. C. Tobias.

S. BIRKENSTEIN & SONS, INC., Chicago. Booth 11. Non-ferrous metals. Die cast exhibit and brass ingots shown for the first time. Represented by: George Birkenstein, Henry Birkenstein, Eli Brown, F. F. Heyman and C. B. Raphael.

BLACK DIAMOND SAW & MACHINE WORKS, Natick, Mass. Booth 445. Sawing machinery.

BLACK & DECKER MFG. CO., Towson, Md. Booths 525-533. Portable electric drills and portable electric grinders; heavy duty electric grinders, snaggers, buffers and swing grinders shown for the first time. Represented by: S. D. Black, president; W. C. Allen, sales supervisor; R. W. Procter, sales manager; R. D. Black, advertising manager; R. E. Mizener, special representative; G. M. Buchanan, sales department; R. S. Mitten, H. B. Hazerodt, G. H. Merriell, W. R. Sprague, J. A. Fairfield and A. H. Walker.

BLAW-KNOX CO., Pittsburgh. Booth 177. Handling buckets.

BLYSTONE MFG. CO., Cambridge Springs, Pa. Booth 340. Sand mixing machinery. Represented by: C. C. McKinney, advertising manager; Luther G. Conroe, general manager.

BOYER CAMPBELL CO., Detroit. Booth 133. Safety devices, flexible shafting and flexible shaft equipment. Represented by: R. N. Brayer and E. N. Lucky.

BRADLEY WASHFOUNTAIN CO., Milwaukee. Booth 487. 54-in. Bradley Washfountain. Represented by: W. H. Slipath, general sales manager.

BRIDGEPORT SAFETY EMERY WHEEL CO., Bridgeport, Conn. Booth 411. Various types of grinders. Represented by: I. L. Burritt, sales manager.

BRITISH ALUMINUM CO., LTD., New York. Booth 75. Aluminum ingots, 98.50 per cent, 99 per cent and special purities and samples showing development of aluminum from ore. Represented by: Arthur Seligman, Arthur Jellinek and Ernest V. Pannell.

BUCKEYE PORTABLE TOOL CO., Dayton, Ohio. Booth 585. Small portable air tools; improvements in No. 002 and No. 34 drills and in new sanding machine shown for the first time. Represented by: W. W. Price, president, C. Humphrey, Mr. Cunningham, H. O. Gummere, W. R. Gummere and H. W. Leighton.

## C

CAMPBELL-HAUSFELD CO., Harrison, Ohio. Booths 441 and 443. Metal melting furnaces; Hausfeld K. C. oil strainer shown for the first time. Represented by: E. B. Hausfeld, secretary; J. S. Armour, sales manager.

CARBORUNDUM CO., Niagara Falls, N. Y. Booths 8-10. Carborundum and Aloxite grinding wheels, Aloxite polishing grains and Carborundum refractories; Carborundum portable sanding machine shown for the first time. Represented by: O. C. Dobson, Pittsburgh; H. A. Kerwin, Chicago; S. F. Courter, division sales manager.

D. L. DARNELL
Assistant Sales Manager, Baker-Raulang Co., Cleveland

H. L. McKINNON
Secretary, C. O. Bartlett & Snow Co. Cleveland

G. L. CANNON
Secretary, Berkshire Mfg. Co., Cleveland

R. MacDONALD
Foundry Expert
Bethlehem Steel Co.
Bethlehem, Pa.

S. DUNCAN BLACK
President, Black & Decker Mfg. Co.
Towson, Md.

W. W. PRICE
President, Buckeye Portable Tool Co.
Dayton, Ohio

J. S. ARMOUR
Sales Manager
Campbell-Hausfeld Co.
Harrison, Ohio

S. F. COURTER
Division Sales Manager, Carborundum Co., Niagara Falls, N. Y.

G. BIRKENSTEIN
S. Birkenstein & Sons, Inc., Chicago

J. G. GALVIN
Advertising Manager
Carter Bloxend
Flooring Co.
Kansas City, Mo.

A. F. HOTTINGER
President
Chicago Crucible Co.
Chicago

J. W. TAYLOR
Detroit District Manager, Clark Tructractor Co., Buchanan, Mich.

H. S. COVEY
Secretary & Sales Manager, Cleveland Pneumatic Tool Co.
Cleveland

LEE KAHN
Vice-President
L. A. Cohn & Brothers, Inc., Chicago

CARR FASTENER Co., Dot Lubricator Division, Cambridge, Mass. Booth 184. High pressure lubricators and guns and fittings. Represented by A. W. Smith, factory sales representative; C. L. Hall, manager New York office; F. D. Johnson, Cleveland sales representative; H. F. Lafaye, Cleveland sales representative; P. K. Niven, sales promotion manager.

CARTER BLOXONEND FLOORING Co., Kansas City, Mo. Booth 159. Standard 8-ft. lengths of Bloxonend flooring. Represented by: L. L. Bucklew, manager Cleveland office; Robert Gordon, manager Detroit office; A. E. Giese, manager Chicago office; J. G. Galvin, advertising manager.

FRANK D. CHASE, INC., Chicago. Booths 37 and 39. Foundry engineering layouts and plans and photos of modern foundry buildings and equipment. Represented by: Frank D. Chase, president; C. R. Cady, chief foundry engineer.

CHICAGO CRUCIBLE Co., Chicago. Booth 185. Crucibles and graphite products. Represented by: A. F. Hottinger, president; J. P. Foraker and W. MacFadden, vice-presidents; J. G. Crowe, district representative; J. W. Mann, service engineer.

CHICAGO PNEUMATIC TOOL Co., New York. Booths 543-547. 12 x 9 N-SB compressor, in operation, furnishing air for hand rammer, chipping hammer and air grinders; both Chicago Pneumatic and Oldham lines of chipping hammers and rammers, in operation; Hicycle grinders and new lines of portable electric screwdrivers, tappers and drills, also in operation. Represented by: A. E. Goodhue, vice-president; H. G. Barbee, manager pneumatic tool sales; A. C. Andresen, special New York representative; H. J. Bannister, special Chicago representative; W. C. Straub, New York district manager; H. C. Gilligan, Detroit district manager; R. F. Eissler, Pittsburgh district manager; J. L. Westenhaven, Cleveland district manager; T. G. Smallwood, Cincinnati district manager.

CHISHOLM-MOORE MFG. Co., Cleveland. Booths 379 and 381. Working models of chain hoists and electric hoists and parts for demonstration.

CLARK TRUCTRACTOR Co., Buchanan, Mich. Booths 374 and 375. 2-ton Truclift, Duat, low-side auto dump tructractor, 2-ton automatic end dump, tractor model tructractor and trailers (duat and trailers to be equipped with Clark hitch). Represented by: J. W. Taylor, Detroit manager.

CLEVELAND FLUX Co., Cleveland. Booth 136. Cornell fluxes for use in all metals. Cornell parting and electrical display curtain showing how and when Cornell fluxes are used in cupolas and ladles. Represented by: Clifford B. Cornell, secretary and treasurer; Kirke Baum, vice-president; Silvia Estrim, assistant secretary; John Gollinger, superintendent; C. D. Pinkerton, sales manager; J. A. Kalal.

CLEVELAND PNEUMATIC TOOL Co., Cleveland. Booths 499 and 501. Foundry air tools and fittings such as chippers, riveters, drills, grinders, sand rammers, Bowes air hose couplings, pressure-seated air valves, Y fittings, manifolds, etc.; light weight ball bearing grinders using small emery wheels or emery sticks for finishing ornamental or decorative iron or bronze castings, signs and bank fixtures shown for the first time. Represented by: H. S. Covey, secretary and sales manager; A. Scott, superintendent; J. T. Graves, Cleveland district representative; H. C. Newton, Chicago district manager; R. E. Ahern, St. Louis district manager; R. E. Manning, Pittsburgh district manager; C. D. Garner, Detroit district manager; G. M. Smalley, Cincinnati district manager.

CLEVELAND WIRE SPRING Co., Cleveland. Booth 352. Steel foundry barrels and boxes, core racks and other shop equipment. Represented by: C. C. Klingman, manager; O. L. Trainor and C. B. Camp, Detroit representatives.

CLIPPER BELT LACER Co., Grand Rapids, Mich. Booth 354. Clipper belt lacers in four models; Clipper belt hooks, six sizes; Clipper belt hooks rustproof; Clipper belt cutters with safety feature; Clipper connecting pins; electrically operated Moring belt display. Represented by: P. E. Crothers, factory representative.

L. A. COHN & BROTHERS, INC., Chicago. Booth 131. Brass, bronze, aluminum and copper ingots, spelter, lead, tin, babbitt, solder, type metal; silver bronze ingots showing grain and polished surface (shown for the first time). Represented by: L. A. Cohn, president; Lee Kahn, vice-president; M. S. Cohn, secretary; Morris Isaacson and H. H. Klein, salesmen.

COMBINED SUPPLY & EQUIPMENT Co., INC., Buffalo. Booth 498. Double angle, angle stem and saddle back chaplets, skim gates, Bowers core paster. Represented by: S. LeViness, Jr., president; C. L. Jackson, vice-president; George H. Bowers and Henry Bowers.

CORN PRODUCTS REFINING Co., New York. Booth 7. Kordek displayed in coves of various shapes and baking of coves in small electric oven. Represented by: S. B. Krantz, representative; Al Kreischer, F. G. Faller and H. A. Crown, salesmen; F. G. Faller, Jr.

CRESCENT BRASS & PIN Co., Detroit. Booth 344. Foundry chaplets and bank pins.

CRESSON-MORRIS Co., Philadelphia. Booth 368. Electrically driven woodworking machines: Twentieth Century woodworking machine shown for first time. Represented by: B. H. Johnson, works manager; J. D. Miller, foundry superintendent; N. P. Wartman, sales manager woodworking division; C. E. Peterson.

CROWN RHEOSTAT & SUPPLY Co., Chicago. Booth 192. Electric driven and ball bearing polishing lathes, shown for the first time, and other apparatus. Represented by: Charles Westen, vice-president; Walter J. Allen, salesman.

## D

DAYTON OIL Co., Dayton, Ohio. Booth 116. Core oil together with cores, cutting oil and

F. G. FALLER, JR.
Salesman, Corn Products Refining Co.
New York

JOHN D. MILLER
Foundry Superintendent, Cresson-Morris Co., Philadelphia

C. WESTEN
Vice-President, Crown Rheostat & Supply Co., Chicago

E. C. THOMPSON
Manager Industrial Sales, Dayton Pneumatic Tool Co., Dayton, Ohio

soluble oil suitable to foundry use. Represented by: D. S. Hopping, owner; George Storer, cutting oil department.

DAYTON PNEUMATIC TOOL Co., Dayton, Ohio. Booth 552. Chipping and scaling hammers, sand rammers, riveting hammers and accessories. Represented by A. B. Hilton, president; J. H. Hobstetter, general manager; L. B. George, manager railroad sales; E. C. Thompson, manager industrial sales; H. W. Norton, chief engineer.

DEISTER CONCENTRATOR Co., Fort Wayne, Ind. Booth 370.

WILLIAM DEMMLER & BROTHERS, Kewanee, Ill. Booths 393-399. Core machines in operation.

DETROIT CORE OIL Co., Detroit. Booth 197. Core oils.

DETROIT ELECTRIC FURNACE Co., Detroit. Booths 521 and 523. Type LFA, 100 kw., 350-lb., Detroit electric furnace and products of Detroit furnace users including brass and bronze castings, rolling mill products, die castings, etc. Represented by: Edward L. Crosby, president and general manager; Albert E. Rhoads, L. B. Barker and J. F. Duffy, sales engineers.

DETROIT HOIST & MACHINE Co., Detroit. Booth 494. Electric and pneumatic hoists. Represented by: A. S. Watson, vice-president and engineer.

DIAMOND CLAMP & FLASK Co., Richmond, Ind. Booth 71. Wood snap flasks, steel jackets, bands, steel bottom boards, core plates and wedges, core boxes; Diamond all-steel bottom plate shown for first time. Represented by: F. J. Gartside, treasurer; E. A. Kinley, production manager.

H. W. DIETERT, Detroit.

JOSEPH DIXON CRUCIBLE Co., Jersey City. Booth 22. Represented by: L. W. Brower, R. R. Bellville, F. R. Brandon, R. H. Brinkerhoff, A. L. Haasis, R. F. Leonard, H. P. Smith and C. A. Shaw.

DOCK & MILL Co., North Tonawanda, N. Y. Booths 174 and 175. Commercial grades of Northern soft textured white pine pattern flask and templet lumber, widths 8 in. to 20 in., lengths 10 ft. to 16 ft., thicknesses 4/4, 5/4, 6/4, 8/4, 10/4, 12/4, 16/4. Represented by: Walter M. Nantke, Elmer J. Semon and J. D. Pierce.

## E

EASTERN CLAY PRODUCTS, INC., Rochester, N. Y. Booth 339. Revivo Bond. Represented by: W. S. Symington III, president; S. H. Cleland and R. L. Cleland.

ELECTRIC CONTROLLER & MFG. Co., Cleveland. Booths 427 and 429. Automatic controllers and starters for alternating current and direct current motors, automatic compensators, safety limit stops for cranes, crane controllers, etc. Represented by: E. F. Vidro, Detroit district manager; W. J. Sonnenburg, Detroit.

ELECTRIC FURNACE Co., Salem, Ohio. Booth 134. Illustrative and descriptive matter regarding T-Grid electric furnaces. Represented by: R. F. Benzinger, vice-president and sales manager; C. L. Foster, Chicago sales representative; F. J. Peterson, Detroit sales representative; S. Floyd Keener, sales representative; F. T. Cope, chief engineer; A. H. Vaughan, engineer.

ELECTRIC STORAGE BATTERY Co., Philadelphia. Booth 166. Storage batteries.

ELECTRIC WELDING MACHINE Co., Detroit. Booth 160. Welding machinery.

ELECTRO-CHEMICAL PATTERN & MFG. Co., Detroit. Booth 15. Copper patterns and core boxes made by Electro Deposition shown for the first time. Represented by: A. K. Laukel, president; J. H. Laukel, vice-president; R. E. Coy.

ELECTRO REFRACTORIES CORPORATION, Buffalo. Booth 130. Tercod crucibles, Buffalo Patch high temperature cement, special refractory shapes, furnace covers, etc. Represented by: L. U. Milward, president; C. A. Asher, Eastern representative; Grant Diamond, chemist; D. B. Milward, salesman.

ELWELL-PARKER ELECTRIC Co., Cleveland. Booth 486. Battery operated annealing oven charger, 5-ton lift truck, 3 to 5-ton ladle and heavy duty crane. Represented by: F. E. Price, Detroit.

## F

FAIRBANKS, MORSE & Co., Chicago. Booth 172. Ball bearing motors, featuring type EH inclosed ventilated motor, particularly adapted to foundry conditions. Represented by: E. J. Hay, Detroit office.

FALK CORPORATION, Milwaukee. Booths 583 and 585. Speed reducers, castings and flexible couplings. Represented by: C. C. Walsh, Detroit; M. A. Carpenter, advertising manager.

FALK PRODUCTS Co., Cadillac, Mich. Booth 200. Falkobond core binder, a new cereal core binder, shown for the first time. Represented by: R. H. Mills, field manager; L. M. Geer, Detroit representative; D. O. Green, sales manager.

FANNER MFG. Co., Cleveland. Booth 6. Foundry chaplets, tumbling stars and flask trimmings. Represented by: J. R. Raible, president; C. G. Raible, vice-president; S. H. Gibson, superintendent; E. Durant, assistant superintendent; F. W. Beck, sales manager; P. D. McDonnell, foundry superintendent; Cliff Ireland, salesman.

FEDERAL FOUNDRY SUPPLY Co., Cleveland. Booths 45 and 47. Foundry specialties and a rest room. Represented by: L. H. Heyl, general manager; John Bayer, T. H. Terry, George H. Donoghue, B. Bernbaum, R. A. Sullivan, O. E. Peterson and George A. Fuller.

A. S. WATSON
Vice-President & Engineer, Detroit Hoist & Machine Co. Detroit

F. J. GARTSIDE
Treasurer, Diamond Clamp & Flask Co. Richmond, Ind.

E. F. VIDRO
Detroit District Manager, Electric Controller & Mfg. Co. Cleveland

C. A. BARNETT
Vice-President and General Manager Foundry Equipment Co., Cleveland

H. M. DAVISON
General Sales Manager Hayward Co., New York

N. P. FARRAR
Advertising Department, Harnischfeger Corporation Milwaukee

W. J. MUHLITNER
Secretary & General Manager, Great Lakes Foundry Sand Co. Detroit

C. H. McCONNELL
Manager, Globe Steel Abrasive Co. Mansfield, Ohio

C. A. REAMER
Assistant Sales Manager, Fowler & Union Horse Nail Co. Buffalo, N. Y.

E. J. LOWRY
Metallurgist
Hickman, Williams & Co., Pittsburgh

S. M. UDALE
Engineer
Holley Carburetor Co., Detroit

M. J. MONAHAN
Michigan and Indiana Agent
International Molding Machine Co., Chicago

DR. P. D. MERICA
Director of Research
International Nickel Co., New York

FOUNDRIES SERVICE CORPORATION. New York. Booths 341 and 342. Three jar rollover and pattern draw molding machines and one hand rammed rollover and draw pattern molding machine. Represented by: Edward Harmes and John J. Lawlor.

FOUNDRY EQUIPMENT Co., Cleveland. Booths 482 and 484. Installation of Coleman car type, portable rack type and rolling drawer core ovens, core racks, etc. Represented by: C. A. Barnett, general manager; H. W. Steindorf, chief engineer; E. J. Welter, representative; M. A. Beltaire, Jr., and C. M. Holcomb.

FOWLER & UNION HORSE NAIL Co., Buffalo. Booth 135. Moldochil nails. Represented by: Charles A. Reamer, assistant sales manager.

## G

RUDOLF GEIGER, Aktiengesellschaft, Ravensburg, Wurttemberg, Germany. Booth 589. Royer sand separators and blenders in operation.

GENERAL ELECTRIC Co., Schenectady, N. Y. Booths 553-557. Cupola blowers, arc welding equipment, water jacketed glue pots and enclosed motors. Represented by: C. T. McLoughlin; J. E. N. Hume, sales manager.

GLOBE STEEL ABRASIVE Co., Mansfield, Ohio. Booth 535. Metal abrasives, Globe cornered steel grit, Globe H. C. chilled shot and various types of castings. Represented by: C. H. McConnell, manager.

GREAT LAKES FOUNDRY SAND Co., Detroit. Booth 110. Special molding, bank, silica and sand blast sands, fire clay and latest sand testing equipment. Represented by: H. P. Mackinnon, manager equipment and engineering division; John D. Cronenweth, president; James G. Mendenhall, assistant sales manager; William J. Muhlitner, secretary and general manager.

GREAT WESTERN MFG. Co., Leavenworth, Kan. Booth 371. Combs gyratory foundry riddles.

GRIMES MOLDING MACHINE Co., Detroit. Booth 223. Grimes jar rammed rollover molding machine, Grimes hand rollover molding machine and jolt stripping plate molding machine. Represented by: George L. Grimes, Charles Skeffington and L. V. Grimes.

## H

J. W. HALLETT & Co., INC., Detroit. Booth 33. Webster's New International Dictionary. Represented by: J. W. Hallett, president.

HARNISCHFEGER SALES CORPORATION, Milwaukee. Booths 579 and 581. Corduroy traction cranes equipped with magnet; model 400 crane equipped with electric magnet shown for first time. Represented by: Henry Harnischfeger, president; Walter Harnischfeger, vice-president; N. P. Farrar, assistant sales manager; B. Van Horn, manager crane sales; C. R. Lund, sales engineer; E. Standfuss, works manager; H. H. Erkelenz, assistant works manager; H. S. Strouse, advertising manager; J. E. Brown, Philadelphia sales engineer.

BENJAMIN HARRIS & Co., Chicago. Booths 87 and 89. Composition and yellow brass ingots. Represented by: D. F. Carscadden, Detroit branch manager; Nathan Harris, treasurer; George C. DeCook, salesman; L. Goldman, vice-president.

R. G. HASKINS Co., Chicago. Booth 500. Flexible shaft equipment for foundry and pattern shop. Represented by: R. G. Haskins, president.

HAYWARD Co., New York. Booths 240 and 242. Hayward electric motor clam shell bucket, Hayward automatic feeder cable take-up reel, air-operated orange peel bucket, models, photographs, etc. Represented by: E. R. Dwelle, salesman; C. S. Sargent, engineer; H. C. Ryder, assistant sales manager; H. M. Davison, general manager of sales.

HERMAN PNEUMATIC MACHINE Co., Pittsburgh. Booths 392-396. Plain jarring machines, jar rollover and pattern drawing machines, jar stripping plate machines in small sizes and ¼-cu. yd. grab bucket. Represented by: Thomas Kaveny, president; A. G. Doyle, vice-president; R. Harris, secretary; R. F. Ringle, works manager; I. J. Oesterling, assistant works manager; T. A. Renkenberg, engineer; Edward Dreuschel, erecting engineer; R. P. Morgan, C. W. Miller, R. M. Porteous, C. S. McMath, W. W. Hughes, L. L. Johnston and Joseph Gibson, service engineers.

HICKMAN, WILLIAMS & Co., Detroit. Booth 151. Represented by: E. J. Lowry, metallurgist; Henry L. Caulkins, Detroit resident manager. HILL & GRIFFITH Co., Cincinnati. Booths 30 and 32. Foundry, facings, supplies and equipment.

HOLCROFT & Co., Detroit. Booth 93. Drawings, literature and descriptive data on melting furnaces, annealing furnaces and core ovens. Represented by: C. T. Holcroft, president; R. T. Cadwell, vice-president; H. L. Ritts, secretary-treasurer; A. Ruckstahl, C. L. Joy and C. H. Martin, engineers.

HOLLEY CARBURETOR Co., Detroit. Booths 591 and 595. Long Life molding machines; casting gray iron in cast-iron molds shown for the first time. Represented by: D. F. W. Candler, general manager; J. L. Dostal, superintendent; H. P. Kimber, chemist; S. M. Udale, engineer; A. Hess, assistant engineer.

HOUGLAND & HARDY, Evansville, Ind. Booth 103. Molding sand. Represented by: C. M. Hardy, president; Eugene W. Smith, Jr., sales manager.

HOWELL ELECTRIC MOTORS Co., Howell, Mich. Booth 367. Inclosed self-ventilated and open motors (shown for the first time). Represented by: C. F. Norton, vice-president; T. F. Mueller, C. H. Passmore, A. A. Ruther and P. M. Arndt.

H. A. KEENER
President
Keener Sand & Clay Co., Columbus, Ohio

JULES DIERCKX
Vice-President and Sales Manager
Keller Mechanical Engineering Corporation, Brooklyn

PETER CASSADY
Western Manager
Keystone Lubricating Co., Philadelphia

H. D. KNIGHT
Manager
H. W. Knight & Sons
Seneca Falls, N. Y.

H. KRAMER
President
H. Kramer & Co.
Chicago

# I

ILLINOIS CLAY PRODUCTS Co., Joliet, Ill. Booths 73 and 75. Fire clays; Fire Clay flour with sand testing machinery showing how used foundry sands can be rebonded with Fire Clay flour shown for the first time. Represented by: Paul Bechtner, secretary.

INDEPENDENT PNEUMATIC TOOL Co., Chicago. Booths 402 and 404. Thor foundry hammer, Thor hoist, Thor sand rammers, Thor portable air grinders, Thor pneumatic tools and Thor electric drills. Represented by: R. S. Cooper, vice-president and general manager; F. W. Buchanan, secretary and assistant general manager, Chicago; V. W. Robinson, Detroit manager; W. A. Nugent, St. Louis manager; G. H. DuSell, Milwaukee manager; A. H. Schuhl, Philadelphia; Carl A. Novinger, A. G. Allen and C. T. Connelly, Detroit sales representatives.

INDIANA COKE & GAS Co., Terre Haute, Ind. Booth 98. Foundry and industrial coke and by-products. Represented by: Leon Stern, general manager of sales; Lewis D McClaren, Chicago resident sales manager; Adrian B. Weaver, sales representative.

INGERSOLL-RAND Co., New York. Booths 571-577. Air compressors, pneumatic chipping hammers, pneumatic sand rammers, pneumatic hoists, pneumatic grinding machines, pneumatic riveting hammers and pneumatic drills; larger size sand rammer, line of stationary air motors and hoists, new sizes of portable pneumatic grinders and improved chipping hammers shown for the first time. Represented by: George C. Williams, W. A. Ursem and H. C. Burgess.

INTERNATIONAL MOLDING MACHINE Co., Chicago. Booths 247-257. Combination jar ramming power turnover power draw molding machines, combination jar ramming power turnover foot draw molding machines, combination jar ramming hand turnover foot draw machines, jarring machines with air lifting cylinders, jolt squeezers, combination jar ramming hand stripping machines, combination jar ramming power stripping machines, jolt-squeeze-strip machines, two-shaft hand stripping plate machines, hand ramming power turnover molding machines and core making machines. Represented by: Edward A. Pridmore, president; W. W. Miller, vice-president; Carl Levahn, general foreman; Frank Seider, in charge of operations; M. J. Monahan, E. G. Borgniz, Luke S. Shannon, Hugh Gallagher, W. J. Rowley and W. J. Briggs.

THE INTERNATIONAL NICKEL Co., New York. Booths 21 and 28. Iron and steel castings containing nickel, commercial forms of nickel and its alloys, projecting machines and technical and trade literature; lathe demonstration of effects of nickel alloy in gray iron shown for first time. Represented by: F. S. Jordan, sales manager; R. A. Wheeler, nickel department; A. J. Wadhams, manager development and research department; P. D. Merica, director of research; D. M. Houston, T. H. Wickenden, J. S. Vanick and Mr. Waltenberg, development and research department.

IRON AGE PUBLISHING Co., New York. Booths 69 and 82. Rest room with copies of THE IRON AGE and reprints of this section. Represented by: Fritz J. Frank, president; W. W. Macon, managing editor; E. H. Cone and Ralph E. Miller, New York editorial staff; F. L. Prentiss, Cleveland resident editor; Rogers A. Fiske, Chicago resident editor; A. H. Dix, manager Reader Service Department; C. S. Baur, general advertising manager, and the following district advertising managers: H. E. Barr, Boston, Emerson Findley, Cleveland; Don G. Gardner, Cincinnati; B. L. Herman, Buffalo; Charles Lundberg, Philadelphia; Pierce Lewis, Detroit; C. H. Ober, New York; W. B. Robinson, Pittsburgh; W. C. Sweetser, New York; D. C. Warren, Hartford, Conn.; F. S. Wayne, Chicago; Charles E. Lachaussee, assistant advertising manager, New York office.

# J

JENNISON-WRIGHT Co., Toledo, Ohio. Booth 353. Kreolite wood block floors and other Kreolite products. Represented by: F. W. Cherrington, director engineering and sales.

JOHNSTON & JENNINGS Co., Cleveland. Booths 220 and 222. Molding machines; jolt squeeze machine, jolt squeeze pattern draw machine and jolt squeeze rollover pattern draw machine shown for first time. Represented by: T. J. Calhoun, vice-president; J. L. Battenfeld and A. W. Gramling, sales engineers.

W. A. JONES FOUNDRY & MACHINE Co., Chicago. Booth 219. Speed reducers. Represented by: W. F. Coleman and Theodore Hegelman.

# K

CHARLES C. KAWIN Co., Chicago. Booth 34.

KEENER SAND & CLAY Co., Columbus, Ohio. Booth 79. Sand and clay. Represented by: Harry A. Keener, president; Claude P. Helmick, secretary.

KELLER MECHANICAL ENGINEERING CORPORATION, Brooklyn. Booths 434 and 436. One type BL Keller universal die and toolroom machine, one R-6 Keller cutter and radius grinder and BK-1 and BK-3 flexible shaft grinder. Represented by: S. A. Keller, treasurer; Jules Dierckx, vice-president and sales manager; Charles Bitter, service manager; A. J. Benson, Leon Desautels, P. D. Brown and G. I. Croll.

WILLIAM H. KELLER, INC., Grand Haven, Mich. Booth 476. Complete line of pneumatic tools. Represented by: Guy S. Warren, vice-president and general manager; Chandler Humphrey, Detroit district manager; W. E. Hall, sales department; Ernest Shaff, engineer.

SPENCER KELLOGG & SONS, INC., Buffalo. Booths 29 and 42. Core oils. Represented by: V. A. Acer, sales manager; M. Agster, chemist; E. G.

D. E. VAN DEUSEN
Sales Engineer
Lakewood Engineering Co., Cleveland

H. M. LANE
President
H. M. Lane Co., Detroit

R. J. HEISSERMAN
Eastern Representative
Link-Belt Co.
Chicago

J. J. HARTLEY
Western Representative
Link-Belt Co.
Chicago

J. D. BRENDEL
Engineer
Modern Pouring Device Co., Port Washington, Wis.

E. J. BYERLEIN
General Manager
Milwaukee Foundry Equipment Co.
Milwaukee

J. R. WEBSTER
Vice-President and General Manager
H. E. Mills Mfg. Co.
Syracuse, N. Y.

A. F. JENKINS
President
Alexander Milburn Co., Baltimore

R. B. LOUDEN
President
Louden Machinery Co., Fairfield, Iowa

H. S. SIMPSON
President
National Engineering Co., Chicago

E. G. JARVIS
President
Niagara Falls Smelting & Refining Corporation, Buffalo

W. H. NICHOLLS
President
William H. Nicholls Co., Inc., Brooklyn

NORMAN BELL
Sales Manager
Norma-Hoffmann Bearings Corporation
Stamford, Conn.

Allen, Cincinnati; E. J. Felt, advertising department; W. L. Goetz, manager core oil department; E. A. Medbery, New England representative; J. A. Miller, Michigan representative; H. J. Strassberger, Buffalo representative; J. N. Yaeger, Western representative.

KEYSTONE LUBRICATING Co., Philadelphia. Booths 438 and 440. Keystone safety lubricating system (shown for the first time) and Keystone lubricants for air tools and electric motors. Represented by: Peter Cassady, Western manager; M. C. Schwenk and Vic Berguson, sales representatives.

KINDT-COLLINS Co., Cleveland. Booth 162. Pattern shop supplies and equipment, Northern cork white pine and Mexican mahogany pattern lumber. Represented by: E. T. Kindt, president; V. I. Kimbel, sales manager.

KING REFRACTORIES Co., Detroit. Booth 189. Refractory materials.

KNEFLER-BATES MFG. Co., Indianapolis. Booth 132. Core binders.

H. W. KNIGHT & SON, Seneca Falls, N. Y. Booth 17. White metal and brass pattern letters, figures and foundry trade marks. Represented by: Dr. Robert Knight and Robert W. Knight.

H. KRAMER & Co., Chicago. Booths 106 and 108. Brass and bronze ingots. Represented by: H. Kramer, president; I. Kaden, vice-president; L. Chapman, sales manager; William Romanoff, technical superintendent.

CHARLES A. KRAUSE MILLING Co., Milwaukee. Booths 4 and 5. TUX. Represented by: S. H. Werner, secretary; C. A. Gage, Ohio sales manager; Joseph M. Remmis, special representative; G. E. Lund, H. D. Farris and C. H. Smith, field engineers.

## L

LAKEWOOD ENGINEERING Co., Cleveland. Booths 388 and 390. Material handling equipment, electric truck-dump trailers and skids, 1926 type tire-lift truck shown for first time. Represented by: D. E. Van Deusen, sales engineer; W. A. Meddick, manager industrial department.

H. M. LANE Co., Detroit. Booth 202. Photographs and drawings of work done by company. Represented by: H. M. Lane, president; G. Pitt, manager architectural department.

LAVA CRUCIBLE Co. OF PITTSBURGH, Pittsburgh. Booth 176. Graphite crucibles, crucible products, super-refractory cements, lining materials, furnace covers, base blocks and lining shapes. Represented by: Paul L. Berkey, president; Furman South, Jr., sales manager and treasurer; D. E. MacLean, Central district sales; C. E. Peck, Eastern district sales; R. P. South, Western district sales; John Hess, superintendent.

LEWIS-SHEPARD Co., Boston. Booth 321. Jacklift elevating trucks and master stackers; Lewis-Shepard master stacker of telescopic type shown for the first time. Represented by: P. A Heller and E. A. Heller, Detroit.

LINDSAY-MCMILLAN Co., Milwaukee. Booth 85. Core oils and cores, cutting oils and lubricants and Rosinal. Represented by: William R. Pate, vice-president; J. A. Gitzen, technical advisor; E. W. Carrington, salesman.

LINK-BELT Co., Chicago. Booths 448-454. Vibrating screen (shown for the first time), new type speed reducer, Caldwell Car Spotter for moving cars at a plant, types of chain used in foundry work displayed on electrically lighted board and photographs of Link-Belt foundry installations. Represented by: R. J. Heisserman, Eastern representative; J. J. Hartley, Western representative.

LOUDEN MACHINERY Co., Fairfield Iowa. Booths 228, 232, 269 and 273. Overhead conveying equipment especially monorail equipment; heavy duty cranes shown for first time. Represented by: R. B. Louden, president; L. F. Berthold, factory representative; W. H. Eldridge and Frederick Boehm, New York; H. L. Stetser and R. H. MacDonald, Philadelphia; A. Neher and W. H. Huenergardt, Chicago; Walt Baylie, Boston; L. D. Turner, St. Louis; W. L. Walker, Cleveland; M. A. Spraley, Atlanta; O. L. Rosenthal, Cincinnati; E. H. Seelbach, Buffalo; P. L. McCain, Pittsburgh.

## M

C. E. MCARTHUR & Co., Chicago. Booth 550. Gagger machine, rod straightener and shear, type F; rod straightener and shear, type D; wire and nail straightener and shear, type G. Represented by: C. E. McArthur, partner; C. L. Stewart and William M. Wilson.

J. S. MCCORMICK Co., Pittsburgh. Booths 435-439. Complete line of foundry facings, supplies, and equipment; McCormick new pyramid riddle shown for first time. Represented by: J. S. McCormick, president; H. T. Herr, Jr., vice-president; F. J. Buerger, secretary; J. S. Hamm, superintendent; S. R. Costley, W. J. Smith, C. C. Bumbaugh, H. J. Winters and H. D. Fowler.

R. W. MCILVAINE Co., Chicago. Booths 364 and 365. Illustrations of sand and mold conveying machinery; automatic moisture control and McIlvaine moisture meter shown for the first time. Represented by: R. W. McIlvaine, manager; R. L. McIlvaine, superintendent; Paul Ackerman, sales division.

MACLEOD Co., Cincinnati. Booths 414 and 416. Sand blast hose machine, sand blast automatic table, sand blast barrel and oil burners; table hose machine, new design, shown for the first time. Represented by: Walter Macleod, president; Albert Moebus and James Lauder.

MALLEABLE IRON FITTINGS Co., Branford, Conn. Booths 509 and 511. Flask rapper. Represented by: G. B. Peckop, assistant superintendent.

MARSHALL BLOW PIPE Co., Detroit. Booth 165.

C. W. JINNETTE
District Manager
Wheel Division
Norton Co.
Worcester, Mass.

A. S. KURTJIAN
Sales Manager
Oliver Machinery Co.
Grand Rapids, Mich.

M. W. ZEMAN
Sales Manager
Osborn Mfg. Co.
Cleveland

T. W. PANGBORN
President
Pangborn Corporation
Hagerstown, Md.

A. N. DUNCAN
Patent Cereal Co.
Geneva, N. Y.

MATHEWS CONVEYOR CO., Ellwood City, Pa. Booth 281.

MATHIESON ALKALI WORKS, INC., New York. Booth 57. Purite and other Mathieson products. Represented by: G. S. Evans, metallurgist; H. D. Honan and J. H. Collins.

METAL & THERMIT CORPORATION, New York. Booth 65. Metals and alloys, thermit foundry cans and thermit welds; metallic titanium shown for the first time. Represented by: Arthur F. Braid, sales manager and metallurgical engineer.

MICHIGAN SMELTING & REFINING CO., Detroit. Booths 358-362. Brass, bronze and aluminum forgings, aluminum and zinc base die castings, [illegible] and bronze, manganese bronze, [illegible] bronze, special alloy ingots, castings made by customers from company's alloys, babbitt metals, solders and soldering coppers; die castings and brass forgings shown for first time. Represented by: R. R. Arnold, sales manager; J. R. Searles, president and general manager; H. Levitt, vice-president; Charles Bloomgarden, assistant general manager; P. Gabriel, manager die casting department; R. W. Funk, manager forging department; Harry Phillips, Marshall Gorman, T. McNamee, C. F. McRae, B. P. Cooke and R. L. DeVoe, salesmen; Paul Gaebelein, superintendent.

ALEXANDER MILBURN CO., Baltimore. Booth 366. Oxy-acetylene welding and cutting apparatus, hydrogen and city gas welding and cutting apparatus, acetylene generators, oil burners and preheaters and paint sprays and equipment, illuminating gas cutting torch shown for first time. Represented by: A. F. Jenkins, president; C. R. Pollard, sales manager.

MILLER-HURST CORPORATION, Detroit. Booth 114.

H. E. MILLS MFG. CO., Syracuse, N. Y. Booth 14. Dry core compounds and facing binders; new Master compound and new Morbon dry core and facing binder shown for first time. Represented by: J. R. Webster, vice-president and general manager; J. M. Shannon, treasurer.

MILWAUKEE FOUNDRY EQUIPMENT CO., Milwaukee. Booths 262-266. Jolt squeezers, jolt squeezing strippers, jolt strippers, jolt rollover draw machines and hand rollover machines. New type hand rollover hand-ram power drawn machine shown for first time. Represented by: E. J. Byerlein, general manager; E. W. Jacobi, Charles G. Jurack, J. E. Lambrix, F. W. Hamel, T. J. Magnuson and L. E. Gregory, sales engineers; H. E. Fellows, factory manager.

MODERN POURING DEVICE CO., Port Washington, Wis. Booth 330. Pouring devices and overhead carrier system for metal pouring operations; Timken roller bearing pouring devices and hand power cranes shown for first time. Represented by: Max Goldberg, president and general manager; W. J. Knappe, sales manager; J. D. Brendel, engineer.

MOLINE IRON WORKS, Moline, Ill. Booth 267. Foundry molding machines. Represented by: John T. Miles, treasurer; B. V. Nutt, vice-president.

MONARCH ENGINEERING & MFG. CO., Baltimore. Booths 387-391. Various sorts of melting and crucible furnaces for foundry use.

## N

NATIONAL ENGINEERING CO., Chicago. Booths 503-507 and 558-562. No. 2 6-ft. diameter pan Simpson intensive sand mixer with high type Simpson bucket loader and laboratory size Simpson intensive sand mixer. Represented by: H. S. Simpson, president; A. G. J. Rapp, in charge of engineering; B. Castor, master mechanic; C. D. Hollins, sales manager; A. C. Christensen, engineer; H. N. Schreuder, New York; W. C. Edgar, Pittsburgh; C. J. Skeffington, Detroit.

NEW HAVEN SAND BLAST CO., New Haven, Conn. Booths 576-586. Sand blast barrels.

NIAGARA CONCRETE MIXER CO., Buffalo.

NIAGARA FALLS SMELTING & REFINING CORPORATION, Buffalo. Booths 84 and 86. Alloys and metals; Falls brand products shown for first time. Represented by: Ernest G. Jarvis.

WILLIAM H. NICHOLLS CO., INC., Brooklyn. Booths 282-300. Combination jolt and power squeezer molding machines. Represented by: William H. Nicholls, president; Al. V. Magnuson, L. R. Schocken, Charles Wakefield and Gustave Anderson, representatives; E. G. Ballard, engineer.

NORMA-HOFFMANN BEARINGS CORPORATION, Stamford, Conn. Booths 38 and 40. Norma-Hoffmann ball, roller and thrust bearings and working models of their applications. Represented by: T. J. Harley and C. H. Wallace, Chicago; R. E. Hecker and C. D. Kilham, Cleveland; D. E. Batesole, assistant engineering manager; Norman Bell, sales manager.

NORTH AMERICAN MFG. CO., Cleveland. Booth 189. Oil burning furnaces and equipment. Represented by: R. A. Smart, district representative.

NORTHERN ENGINEERING WORKS, Detroit. Booths 544 and 546. 5-ton Standartized LE crane trolley; Hilift electric hoists and an air hoist; Hilift electric hoist shown for first time. Represented by: H. W. Standart, president; S. E. Schneider, manager sales promotion.

NORTON CO., Worcester, Mass. Booths 493 and 495. Grinding wheels, grinding machines and refractories. Represented by: C. W. Jinnette, district manager wheel division; A. G. Green, district sales engineer; Herbert Duckworth, sales manager wheel division.

## O

S. OBERMAYER CO., Chicago. Booths 509-511 and 564-566. Facings, equipment, etc. Represented

F. L. MOORE
Treasurer and Sales Manager
Peerless Sand Co.
Conneaut, Ohio

M. HOUSKEEPER
Sales Manager
Charles Pettinos
New York

G. A. T. BROWN
Foundry Service Department
Pickands, Brown & Co., Chicago

W. B. WALLIS
President
Pittsburgh Electric Furnace Corporation
Pittsburgh

F. H. DEISHER
President
Royersford Foundry & Machine Co.
Royersford, Pa.

E. J. LYBERT
Western Representative
Rollway Bearing Co., Inc., Syracuse, N. Y.

W. S. QUIGLEY
President
Quigley Furnace Specialties Co.
New York

D. J. RIDINGS
Advertising Manager
Porter-Cable Machine Co., Syracuse, N. Y.

LEE R. FARRELL
Secretary and Sales Manager
Portage Silica Co.
Youngstown, Ohio

R. RUEMELIN
President
Ruemelin Mfg. Co.
Minneapolis

H. G. BENNETT
Salesman
Safety Emery Wheel Co.
Springfield, Ohio

R. T. TURNER
Sales Promotion Manager
Shepard Electric Crane & Hoist Co.
Montour Falls, N. Y.

B. T. SHERK
Western Manager
Skybryte Co.
Cleveland

by: Theodore Kauffmann, president; S. T. Johnston and E. D. Frohman, vice-presidents; J. L. Cummings, manager refractory division; A. N. Wallin, O. C. Olson, W. R. Cummings, W. C. Samuels and J. J. McDevitt, salesmen.

OILESS CORE BINDER CO., Cleveland. Booth 191. Oiless core binder, test blocks, intricate castings and cokes. Represented by: H. A. Baker, secretary and treasurer; J. A. Hamilton, vice-president; H. B. Fischer, sales manager.

O. K. TOOL CO., Shelton, Conn. Lathe, shaper and planer tools.

OLIVER MACHINERY CO., Grand Rapids, Mich. Booths 376-386. Pattern shop equipment and production woodworking machinery. Oliver No. 116-D high speed motor-on-shaft band saw completely inclosed; Oliver No. 173-B improved jig saw of latest type; Oliver No. 51-B four speed motor head lathe with controller mounted directly on motor with patented unit; Oliver No. 71-D three speed horizontal boring machine, direct motorized power stroke and power hold down clamp; Oliver No. 92-D motor head power feed mortiser; No. 487-E single spindle shaper, all shown for first time. Represented by: A. S. Kurkjian, sales manager; J. E. McLauchlen, eastern Michigan representative.

OSBORN MFG. CO., Cleveland. Booths 225-237. Complete line of modern molding machines with many improvements shown for first time. Represented by: M. W. Zeman, sales manager; E. S. Carman, secretary and chief engineer; R. W. Hisey, assistant works manager; E. F. Oyster, mechanical engineer; J. D. Wise, assistant sales manager; E. T. Doddridge, J. C. Alberts, F. T. Spikerman, R. E. Kiefer, H. B. Klar and G. G. Adam, sales engineers.

OXWELD ACETYLENE CO., New York. Booths 270 and 272. Spot-hardening of gray iron malleable castings and covering of metallic surfaces with Stellite by means of the Oxweld blowpipe, the latter shown for the first time. Represented by: E. E. Thum, technical publicity manager; Frank Langstrom, Detroit district manager; H. H. Griffith and R. W. Boggs.

## P

PANGBORN CORPORATION, Hagerstown, Md. Booths 467-485 and 520-538. Full line of sand blast and dust suppression equipment. Represented by: Thomas W. Pangborn, president; John C. Pangborn, vice-president; H. D. Gates, sales promotion manager; P. J. Potter, works manager; Foster J. Hull, chief engineer; W. A. Rosenberger, assistant chief engineer; Charles T. Bird, Detroit; Fred E. Wolf, Pittsburgh; W. T. Randall, Philadelphia; E. C. Gilmour, St. Louis; G. A. Cooley, Springfield; J. J. Carr, Cleveland; J. J. Bowen, Rochester; W. C. Lytle, Chicago; L. W. Wagner, Detroit sales department; L. E. Nelson, mechanician.

PATENT CEREALS CO., Geneva, N. Y. Booth 88. Rex core and facing binder. Represented by: A. N. Duncan and T. K. Fahy.

PEERLESS SAND CO., Conneaut, Ohio. Booth 83. Molding and core sands, milled and natural. Represented by: F. L. Moore, treasurer and sales manager; C. E. Moore, assistant sales manager; C. M. Bixler, president and general manager.

GEORGE W. PERKS CO., Akron, Ohio. Booth 122.

CHARLES PETTINOS, New York. Booth 111. Molding sand, core sand, sand blast sand, plumbago, core wash and blacking; new line of core blackings shown for first time. Represented by: M. M. Houskeeper, sales manager; William T. Bennett, special representative.

GEORGE F. PETTINOS, Philadelphia. Booth 194. Samples of foundry sands and graphite. Represented by: Geo. A. Doughten, sales manager; E. G. Stratton, Erie; J. H. Hatten, T. H. Walker, D. S. Gemans and T. W. Owings, salesmen.

PICKANDS, BROWN & CO., Chicago. Booth 1. Foundry coke. Represented by: George A. T. Long, foundry service department.

PITTSBURGH ELECTRIC FURNACE CORPORATION, Pittsburgh. Booths 593-595. 'Lectromelt furnace pouring gray iron for Holley Carburetor molds, 50-lb. ladle type 'Lectromelt and Power Demand Limatator for use in conjunction with electric arc melting furnaces; small ladle type 'Lectromelt shown for first time. Represented by: W. B. Wallis, president.

PORTAGE SILICA CO., Youngstown. Booth 92. Portage steel molding, core and sand blast sands and Portage silica rock in natural state. Represented by: E. E. Klooz, vice-president and general manager; C. F. Eberhart, chief clerk; Lee R. Farrell, secretary and sales manager.

PORTER-CABLE MACHINE CO., Syracuse, N. Y. Booth 432. Belt sanders and grinders, band saw, spindle sander, Universal milling machine attachment, disk sander and grinder, all motor driven; portable hand surfacing machine for sanding and grinding shown for first time. Represented by: D. J. Ridings, advertising manager.

PRODUCTION EQUIPMENT CO., Cleveland. Booths 590-594. Sandcutter and steel flasks, all shown for first time. Represented by: L. P. Orr, H. E. Johnson, R. H. Cleminshaw, O. L. Rimoldi and K. E. Deems.

## Q

QUIGLEY FURNACE SPECIALTIES CO., New York. Booth 119. Hytempite, Gauisand, Quigley refractory gum and Quigley Triple-A solution; refractory gum and Triple-A solution shown for first time. Represented by: W. S. Quigley,

S. C. VESSY
President
W. W. Sly Mfg. Co.
Cleveland

OMER S. SMITH
Vice-President
Smith Oil & Refining Co., Rockford, Ill.

W. G. SMITH
President
Werner G. Smith Co.
Cleveland

IRA H. SPENCER
President
Spencer Turbine Co.
Hartford, Conn.

E. A. PARKER
President
Springfield Aluminum Plate & Castings Co.
Springfield, Ohio

president; W. H. Gaylord, Jr., vice-president; D. F. McMahon and H. M. Thompson, service engineers.

## R

RACINE TOOL & MACHINE CO., Racine, Wis. Booth 433. Racine high speed metal cutting machines and Racine duplex band saws. Represented by: E. R. Larson, district sales manager; M. E. Erskine, president; Ray Fuller, demonstrator.

REEVES PULLEY CO., Columbus, Ind. Booth 188. Reeves variable speed transmission. Represented by: Carl M. Reeves, vice-president.

RICHARDS-WILCOX MFG. CO., Aurora, Ill. Booths 489 and 491. Over-way track equipment and ball bearing I-beam trolleys. Represented by: W. H. Fitch, president; H. R. Butler, New York; E. J. G. Phillips, chief engineer; E. F. Brumbaum, Detroit.

ROBESON PROCESS CO., New York. Booth 70. Binders and literature regarding them. Represented by: T. J. Ryan, T. J. O'Hara and J. A. Smith, salesmen; B. W. Bullen, assistant treasurer.

WILLIAM C. ROBINSON & SON CO., Baltimore. Booth 112. Core wax and oils and greases for foundry use.

ROGERS BROWN & CROCKER BROTHERS, INC., Pittsburgh. Booths 355-357. Pig iron, foundry coke, molding and core sand and alloys. Represented by: F. W. Bauer, Chicago; T. A. Wilson, Pittsburgh; Harwood Wilson, Cleveland; George R. Sullivan, Philadelphia; F. W. Miller, Cincinnati; all vice-presidents; J. C. Mears, Chicago resident manager; R. T. Melville, Buffalo resident manager; J. R. Morehead and A. J. Wentworth, Cincinnati; H. T. Outwater, New York.

ROHRBACHER SHOE CO., Boston. Booth 16. Shoes for foundrymen. Represented by: F. H. Rohrbacher, D. M. Hall, G. A. Moore and A. L. Rohrbacher, Jr.

ROLLWAY BEARING CO., INC., Syracuse, N. Y. Booth 548. New Rollway line shaft bearings (shown for the first time), crane hook thrust bearings; bearings and housings for crane motors, maximum type bearings for snagging grinders and wide series bearings for molding machines, foundry trucks, conveyors and core ovens. Represented by: Samuel Farrell, district representative; F. J. Lybert, Detroit.

ROSS-TACONY CRUCIBLE CO., Tacony, Philadelphia. Booth 31. Graphite crucibles, graphite stopper heads, graphite nozzles, sleeves and special shapes. Represented by: C. S. Orne, Jr. and I. R. Robinson, Western representatives; W. C. Yenger, Eastern representative; Charles C. Bacon, secretary.

ROYER FOUNDRY & MACHINE CO., Kingston, Pa. Booths 239-245. Royer sand separators and blenders.

ROYERSFORD FOUNDRY & MACHINE CO., INC., Royersford, Pa. Booths 478 and 480. Roller bearing tumbling mill and foundry grinder, former shown for first time. Represented by: F. H. Deisher, president; M. G. Sperzel, sales manager.

RUEMELIN MFG. CO., Minneapolis. Booth 563. Sand blasts and sanitary cabinets; sanitary steel sand blast room, dust arrester and automatic sand blast machine shown for first time. Represented by: Richard Ruemelin, president; C. H. Scholer.

## S

SABIN MACHINE CO., Cleveland. Booth 18. Steel foundry barrels and Sabin barrel trucks. Represented by: O. C. Sabin, assistant manager; H. B. Sabin, president.

SAFETY EMERY WHEEL CO., Springfield, Ohio. Booths 383 and 385. Grinding machines and abrasive products; new type grinder shown for first time. Represented by: W. H. Vance, F. T. Wisner and H. G. Bennett, salesmen; H. G. Weinland, mechanical engineer.

SEMET-SOLVAY CO., Detroit, Mich. Booths 170 and 171. Foundry and domestic coke. Represented by: James A. Ballard, sales manager; Samuel Weiss, Buffalo district sales manager; Robert H. Watson, metallurgist; A. P. McClure, foundry coke salesman; D. S. McEachern, fire and safety engineer.

SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y. Booths 401-407. Cage-controlled cupola charging hoist with dummy cupola in operation. Represented by: F. A. Hatch, general manager; R. H. McGredy, sales manager; R. T. Turner, sales promotion manager; G. L. Drake, agency sales manager; G. G. Robbins, W. B. Briggs and J. D. Gillette, sales engineers; H. D. Crout, service engineer.

SIMONS PAINT SPRAY BRUSH CO., Dayton, Ohio. Booth 58. Paint spray machine with portable air compressor with paint spray brush and container shown for first time. Represented by: George W. Simons.

SKEPPSTEDT-ERICKSON CO., Moline, Ill. Booth 275. Types A and B Skeppstedt multiple core machines in operation, Skeppstedt adjustable core bench, cores and castings. Represented by: Olof Skeppstedt, owner; E. G. Erickson, partner.

SKYBRYTE CO., Cleveland. Booth 198. Skybryte liquid glass cleaning material. Represented by: T. T. Holt, president; B. T. Sherk, Western manager.

W. W. SLY MFG. CO., Cleveland. Booths 449-459 and 502-512. Nos. 00, 2 and 4 sandblast mills, sandblast room with turnable equipment, tumbling mill, dust arrester, pressure type rotary table with separator and elevator and steel molding sand reclaiming outfit. Represented by: C. P. Guion, R. O. Mullen, Chicago; C. P. Carter, New York; D. L. Harris, Spring-

H. E. BOUGHTON
Vice-President and General Manager Standard Sand & Machine Co. Cleveland

I. R. SMITH
President Sterling Wheelbarrow Co., Milwaukee

J. T. STONEY
President and General Manager Stoney Foundry Engineering & Equipment Co., Cleveland

E. P. IVORY
Extension Manager Sugar Pine Sales Co. San Francisco

G. H. WADSWORTH
President, Wadsworth Core Machine & Equipment Co. Akron, Ohio

VOLNEY FOSTER
President United States Silica Co., Chicago

M. J. HERROLD
Sales Manager United States Electrical Tool Co. Cincinnati

R. M. MAULL
Secretary & Treasurer Tabor Mfg. Co. Philadelphia

C. F. MAYER
Manager Swarwout Co. Cleveland

K. L. POHLMAN
Grinder Sales Department, Warner & Swasey Co., Cleveland

JERVIS B. WEBB
President, Jervis B. Webb Co., Detroit

T. S. HAMMOND
President, Whiting Corporation Harvey, Ill.

WILLIAM J. DALY
Sales Engineer Worthington Pump & Machinery Corporation, New York

field, Mass.; W. L. Kammerer, St. Louis; R. W. Hasselle, Chattanooga, Tenn.; L. B. Brewster and H. C. Nicholas, district representatives; G. A. Boesger, chief engineer; F. A. Ebeling, sales manager.

SMITH-MONROE Co., South Bend, Ind. Booth 343. Gast compressed air separator. Represented by: L. R. Smith, president; R. O. Monroe, secretary and treasurer; C. L. Scribner, factory representative; O. J. Lynch and A. F. Squier, Coon-DeVisser Co., Detroit representative.

SMITH OIL & REFINING Co., Rockford, Ill. Booth 318. Core oil. Represented by: Arthur A. Abramson and Frank C. Maley, sales department; Omer S. Smith, second vice-president.

WERNER G. SMITH Co., Cleveland. Booths 51-55 and 64-68. Linoil and other core oils. Represented by: Werner G. Smith, president; Milton S. Finley, vice-president; J. C. DeVenne, secretary; N. A. Boyle, treasurer; L. F. Ferster, advertising manager; Frank H. Dodge, Detroit manager; L. P. Robinson, New England manager; George Furman, Western manager; I. M. Gerteis, sales manager; George H. Graham, Philadelphia; M. M. Werckman, Dayton, Ohio; John M. Glass, Indianapolis.

SPENCER TURBINE Co., Hartford, Conn. Booth 492. Spencer turbo compressors. Represented by: S. E. Phillips, secretary; H. M. Grossman, sales engineer; R. B. Richardson, district representative; O. J. Dingee.

SPRINGFIELD ALUMINUM PLATE & CASTING Co., Springfield, Ohio. Booth 359. Aluminum castings, pattern work and aluminum specialties. Represented by: E. A. Parker, president; W. H. Parker, general superintendent.

STANDARD SAND & MACHINE Co., Cleveland. Booth 496. No. 3½ standard batch mixer with revolving screen. Represented by: Harry E. Boughton, vice-president and general manager; P. E. Lacey, secretary and treasurer.

STANDARD SILICA Co., Chicago. Booths 100 and 102. Core sands, featuring comparison silica, lake and bank sands for core work; screened crude silica sand shown for first time. Represented by: R. W. McCandlish, sales manager; F. D. Chadwick, plant manager; A. C. Goodnow, vice-president.

STERLING WHEELBARROW Co., Milwaukee. Booth 180. Rolled steel flasks, special foundry wheelbarrows; foundry trucks and foundry specialties. Represented by: H. H. Baker, secretary; George Lambkin, New York manager; H. J. Felsburg, Philadelphia manager; J. M. Dickson, Cleveland manager; J. J. Coyne, Chicago manager; O. E. Steef, St. Louis manager; J. A. Patterson, Detroit manager.

FREDERIC B. STEVENS, INC., Detroit. Booths 120 and 121. Products of foundry facing mill and foundry equipment. Represented by: Frederic B. Stevens, president; W. H. Joseph Cluff, vice-president; John M. Mayers, secretary; Lewis H. Kirby, treasurer.

STONEY FOUNDRY ENGINEERING & EQUIPMENT Co., Cleveland. Booths 410 and 412. Shakeout ball, core knockout machine, vibrators and vibrator molding machine. Represented by: J. T. Stoney, president; E. S. Cohen, chief engineer; George A. Scott, sales engineer; Joe Soukop, superintendent; L. J. Reinhard, sales manager.

SUGAR PINE SALES Co., San Francisco. Booths 337 and 338. Sugar pine pattern lumber. Represented by: E. P. Ivory, extension manager; Roy C. Welch, New England representative.

SULLIVAN MACHINERY Co., Chicago. Booths 406 and 408. Angle compound direct connected air compressor, single stage belted compressor, Sullivan Turbinair grinder and Sullivan portable Turbinair hoist. Represented by: Jos. H. Brown, Chicago sales manager; R. B. Hosken, general sales manager; W. H. Duffill and H. M. Stark, Detroit sales representatives; Robert S. Moth.

SUNDSTRAND MACHINE TOOL Co., Rockford, Ill. Booth 497.

SUPERIOR SAND Co., Cleveland. Booth 97. Sands for production of aluminum, brass, heavy and light grey iron and malleable iron castings. Represented by: C. D. Pinkerton; H. C. Koontz, secretary and treasurer.

SUPERIOR SIZING Co., INC., Lockport, N. Y. Booth 118. Linabond and Bondrite core oils, Partrite parting and Korekote core wash, all shown for first time. Represented by: R. M. Snell, vice-president; E. J. Johnstone, general manager; F. J. MacMullin, resident manager; F. A. Roehlk, plant superintendent; J. E. Kershaw, salesman.

SWAN & FINCH OIL CORPORATION, Chicago. Booth 101. Core oil. Represented by: H. W. Jones, Detroit sales manager; Arthur J. Kies, Michigan representative; B. W. Deacon and R. S. Middleditch, Detroit.

SWARTWOUT Co., Cleveland. Booth 565. Core ovens; drawer oven and lift door shown for first time. Represented by: C. F. Mayer, manager.

## T

TABOR MFG. Co., Philadelphia. Booths 234, 238, 277 and 279. Foundry molding machines; jar-squeezing-stripping plate molding machine and post type squeezer, both plain squeeze type and jar squeeze, shown for first time. Represented by: Wilfred Lewis, president; F. R. Wallace, vice-president; Robert M. Maull, secretary and treasurer; J. T. Ramsden, chief engineer; R. H. Wiehsner, engineer; William E. Sewell, J. H. Coleman, H. W. Impey, John Pfender, T. L. Sumner and P. J. Shire, salesmen.

TAYLOR INSTRUMENT Co's. Rochester, N. Y. Booth 107. Recording devices.

TESSMER MACHINE & TOOL Co., Detroit. Booth 542. Sprue cutters, tumbling barrels, vibrators, electric sand riddles, blowoff valves, knee valves,

M. C. MAXWELL
General Superintendent, Yale & Towne Mfg. Co., Stamford, Conn.

J. E. N. HUME
Sales Manager General Electric Co. Schenectady, N. Y.

F. E. PRICE
Detroit District Manager, Elwell-Parker Electric Co., Cleveland

S. H. WERNER
Secretary, Charles A. Krause Milling Co. Milwaukee

A. A. MOEBUS
Engineer MacLeod Co. Cincinnati

flask clamps, molding benches and air separators; pneumatic shaker shown for first time. Represented by F. P. Tessmer, manager; G. S. Brennan, assistant.

WARNER R. THOMPSON CO., Detroit. Booth 96.

TIONA PETROLEUM CO., Philadelphia. Booth 109. Tiona cutting oils and other Tiona products.

TRANSMISSION BALL BEARING CO., INC., Buffalo. Booth 179. Chapman bearings and Chapman frame grinder. Represented by: C. M. Murray, president; E. Hambleton, chief engineer; B. C. Brown, sales representative.

TRUSCON STEEL CO., Youngstown. Booths 415-421. Truscon alloy steel foundry flasks, bottom boards, core plates, core racks, mold jackets, snap flask bands, Truscon alloy steel platforms and boxes and material handling equipment. Represented by: George F. Sparks, general manager; N. C. Ferreri.

W. S. TYLER CO., Cleveland. Booth 167. Ornamental iron and bronze products and wire cloth and screen for foundry uses.

## U

UNITED COMPOUND CO., Buffalo. Booth 317. Buffalo brand vent wax and pattern wax.

UNITED STATES ELECTRICAL TOOL CO., Cincinnati. Booths 472 and 474. Portable electrical drills, pedestal grinders, buffers and polishers; adjustable speed grinders shown for first time. Represented by: William J. McFarland, Detroit district manager; G. E. Smith, treasurer; Matt J. Herold, general sales manager.

UNITED STATES GRAPHITE CO., Saginaw, Mich. Booth 36. Mexican graphite and products, foundry facings and core wash. Represented by: A. J. Heindel, Detroit; R. J. Edmiston, Pittsburgh; G. D. Robinson, Buffalo; R. A. Corrigan, Chicago; C. H. Schenck, Saginaw; A. S. Harvey, vice-president.

UNITED STATES SILICA CO., Chicago. Booth 137. Flint Shot sand blast abrasive and Flint Silica core and steel molding sand. Represented by: Volney Foster, president; H. F. Goebig, vice-president; O. M. Olsen, engineer.

## W

WADKIN & CO., LEISTER, England. Booths 461 and 463. Wadkin universal wood milling machine for the mechanical production of patterns, in operation on all classes of pattern work.

WADSWORTH CORE MACHINE & EQUIPMENT CO., Akron, Ohio. Booth 488. Core room equipment. Represented by: George H. Wadsworth, president and general manager; M. C. Sammons, secretary.

J. D. WALLACE & CO., Chicago. Booth 447. Portable woodworking machinery; Wallace No. 8 universal saw and Wallace electric hand saw shown for first time. Represented by: J. D. Wallace, president; H. L. Ramsay, sales-advance manager; J. B. Murphy, assistant sales manager; A. Armstrong, Detroit sales manager.

WARNER & SWASEY CO., Cleveland. Booth 490. Pneumatic portable grinders and drills; pneumatic portable drill shown for first time. Represented by: C. S. Stilwell, manager Detroit office; K. L. Pohlman and C. W. Campbell, grinder sales.

JERVIS B. WEBB CO., Detroit. Booth 221. Foundry molding conveyor, overhead continuous trolley chain conveyor and standard chain and trolley parts; overhead conveyor system and special molding conveyor shown for first time. Represented by: Jervis B. Webb, president; D. A. Blair, chief engineer; George R. Melville.

WELDIT ACETYLENE CO., Detroit. Booth 320. Weldit Gasaver.

WESTINGHOUSE TRACTION BRAKE CO., Pittsburgh. Booths 537 and 539. Westinghouse-National type 3VS-30 piston displacement, 100 lb. pressure motor driven air compressor, 3-phase, 60-cycle, 220-volt alternating current motor, including HP automatic control; Westinghouse enameled storage air reservoir, air operating valves, standard air cutout cocks, air hose with fittings; Westinghouse-National hydraulic press shown for the first time. Represented by: J. F. Ames, New York; M. H. Burchard, S. A. King and C. E. Smith, Chicago; R. G. Justus, St. Louis; F. C. Young, S. B. Schrontz and W. C. Burrias, Pittsburgh; Lawrence Wilcox and W. M. Bisel, Columbus, Ohio.

WHITEHEAD BROTHERS CO., Buffalo. Booths 43 and 56. Foundry sands, clays and gravels, foundry facing and supplies.

WHITING CORPORATION, Harvey, Ill. Booths 513-517 and 568-572. Miscellaneous equipment. Represented by: J. H. Whiting, chairman of board; T. S. Hammond, president; A. H. McDougall, vice-president and construction engineer; N. S. Lawrence, vice-president and equipment sales manager; G. P. Fisher, metallurgist; A. J. Grindle, vice-president Grindle Fuel Equipment Co.; R. E. Prussing, Detroit district manager.

G. H. WILLIAMS CO., Erie, Pa. Booth 172. Williams Hook-on foundry bucket and motion picture of bucket in operation. Represented by: C. D. Buoy, T. D. Harter, G. S. Swanson and A. J. Lichtinger, sales engineers; H. F. Randall, secretary and general manager.

E. J. WOODISON CO., Detroit. Booths 442-446. Foundry supplies and equipment and polishing

W. H. FITCH
President
Richards-Wilcox Mfg. Co., Aurora, Ill.

J. D. WALLACE
President
J. D. Wallace & Co. Chicago

H. E. DICKERMAN
General Sales Manager, Chisholm-Moore Mfg. Co. Cleveland

E. J. HAY
Detroit Representative Fairbanks, Morse & Co., Chicago

CLIFFORD B. CORNELL
Secretary - Treasurer
Cleveland Flux Co.
Cleveland

W. L. GOETZ
Manager Core Oil Department
Spencer Kellogg & Sons, Inc.
Buffalo

JOHN B. WRIGHT
Assistant to Vice-President
Westinghouse Traction Brake Co.
Pittsburgh

A. J. MILLER
President
Whitehead Bros. Co.
Buffalo

ARTHUR SIMONSON
Sales Manager
Falk Corporation,
Milwaukee

and platers supplies; improvements on core equipment shown for first time. Represented by: E. J. Woodison, president; C. H. Woodison, vice-president; C. D. Yahne, treasurer; J. C. Woodison, secretary; George A. Burman, manager manufacturing; H. S. Hoffman, B. E. Beldin, W. J. Wark, L. A. Dawson and F. F. Shortsleeves, branch managers; H. T. Taylor, M. E. Nordman, E. C. Shaefer, A. J. Becker, J. F. Webb, W. J. Haggman and R. M. Buckingham, salesmen.

WORTHINGTON PUMP & MACHINE CORPORATION, New York. Booths 559 and 561. Duplex two-stage air compressor with 105 hp. General Electric synchronous motor; synchronous motor attachment shown for first time. Represented by: William J. Daly and F. W. Hankins, sales engineers.

## Y

YALE & TOWNE MFG. CO., Stamford, Conn. Booths 514 and 516. Yale electric chain hoists, Yale electric industrial truck, pressed steel crane ends, chain blocks and trolleys; Yale two speed foundry control, electric chain hoist and Yale pressed steel crane ends shown for first time. Represented by: Maxwell C. Maxwell, general superintendent; H. J. Fuller, manager material-handling equipment sales; F. A. Dewey and E. H. Fairchild, district sales managers.

YOUNG BROTHERS CO., Detroit. Booths 274 and 276. Large oven showing different types of doors and model installations of test ovens, baked products, etc. Represented by: George A. Young, Charles H. Lisch, R. B. Reed, V. A. Fox, H. M. White, C. W. Mullenhagen, T. P. McVicker, C. G. Lisch, P. A. Meyer, G. I. Thatcher and F. E. Gardiner.

# Visiting Foundrymen to International Congress at Detroit

THE itinerary for the tour of the foreign foundrymen who will attend the second international foundrymen's congress and the thirtieth annual convention of the American Foundrymen's Association was published in THE IRON AGE, July 15, page 186. The list of those who registered for the journey through various foundry centers of the United States is as follows:

### From Belgium

Paul Ropsy, president Association Technique de Fonderie de Belgique, managing director Belgian Griffin Co., Merxem-les-Anvers.

Leon Gerard, manager Fonderies Nestor Martin, 45 rue Ulens, Brussels.

G. Fosseprez, managing director Nouvelle Societe des Acieries de Mons, Nimy-les-Mons.

P. C. Fassotte, Pittevil & Co., 1 Place du Champ de Mars, Brussels.

### From France

E. V. Ronceray, vice-president Association Technique de Fonderie de France, managing director Etablissements Bonvillain et Ronceray, rue Paul-Carle, Choisy-le-Roi, near Paris.

H. Magdalenat, vice-president Association Technique de Fonderie de France and managing director S. A. des Usines de Rosieres, Bourges, Cher.

Leon Pierre, Montupet, Fonderies Montupet, 11 Boulevard Lannes, Paris.

Claude Primet, Fonderies Montupet, Paris.

Paul Thome, managing director S. A. des Fonderies Thome Fils & Cromback, Nouzonville, Ardennes.

Mr. Cantenot, manager malleable iron foundry, Acieries de Firminy, Firminy, Loire.

H. Saint-Clivier, manager Acieries de Firminy, Firminy, Loire.

### From Germany

Dr. ing. Geilenkirchen, managing director Verein Deutscher Eisengiessereien, Dusseldorf.

Dipl. ing. Gruson, Otto Gruson & Co., Magdeburg-Buckau.

Dipl. ing. H. L. Korschann, Duisburg, Prinzenstr. 33.

Dr. Heinr. Biagosch, partner of Karl Krause, Leipzig.

Fritz Buch, Carl Buch G.m.b.H., Weidenau.

Direktor J. H. Fahr, Maschinenfabrik Fahr, Stockach-Baden.

Dipl. ing. Flender, A. Friedr. Flender & Co., Bocholt.

Dir. Dr. Greiner, Maschinenfabrik Esslingen, Esslingen-Neckar.

Fabrikant Gross, Jr., Bugeleisenfabrik, A. G., Schab, Hall.

Direktor Hellmund, Eisen-und Stahlwerk Werner, Dulken.

Direktor Karl Jaeger, Reutherwerk, Mannheim-Wladhof.

Heinz Kremener, Alexander Kremener, Hartung A. G., Breitestrasse 48, Berlin.

Fr. Kuppersbusch, Kuppersbusch & Sohne, Gelsenkirchen.

Dir. Wilh. Linnmann, Eisener Eisenwerke, Essen-Altenessen.

Dir. Rudolf Muller, Hartung A. G., Berlin.

Dir. Nagel, manager Badische Maschinenfabrik & Eisengiesserei, Durlach-Baden.

Prof. Dr. Piwowarski, Technische Hochschule, Aachen.

G. A. Schmole, Jr., Schmole & Co., Menden.

Dir. Alfred Simon, M. Streicher, Stuttgart-Cannstatt.

Erwin Simon, M. Streicher, Stuttgart-Cannstatt.

Max Jul. Unger, Unger & Co., Werdau.

Heinr. Werther, Magdeburg & Werther, Halle-Saale.

Mr. Monforts, Eisengiesserei Monforts, Munchen-Gladbach.

Max Becker, Eisengiesserei Rodinghausen, Menden.

Kommerzienrat Demmer, Gebr. Demmer, Eisenach.

Generaldirektor Hugo Eicken, W. Krefft A. G., Gevelsberg.

Direktor Ernst Hummel, Gebr. Reuling, Mannheim-Neckarau.

Direktor Philipp Roeder, Gebr. Roeder A. G., Darmstadt.

Hans Roeder, Gebr. Roeder A. G., Darmstadt.

Kommerzienrat Billand, Armaturenwerk A. G., Kaiserslautern.

Ing. C. Irresberger, Salzburg, Reichenhallerstrasse 7a.

Obering. Weichel, Armaturenwerk, Kaiserslautern.

Ber. Ing. Joh. Mehrtens, Berlin, W. 30.

### From Great Britain

S. H. Russell, vice-president Institute of British Foundrymen; partner of S. Russell & Sons, Bath Lane Foundry, Leicester.

John Cameron, past president Institute of British Foundrymen; Cameron & Roberton, Ltd., South Bank Ironworks, Kirkintilloch, near Glasgow, Scotland.

H. D. Campbell, Shaw Glasgow, Ltd., Maryhill Iron Works, Glasgow, Scotland.

Thomas H. Gray, Thomas E. Gray & Co., Ltd., London.

William Jolley, Institute of British Foundrymen and member of the council British Cast Iron Research Association; Metropolitan-Vickers Electric Co., Ltd., Manchester.

W. B. Lake, Lake & Elliot, Ltd., Braintree, Essex.

E. Longden, J. H. Hetherington & Son, Ltd., 158 Manley Road, Manley Park, Manchester (South).

James M. Primrose, Grangemouth Iron Co., Grange Ironworks, Falkirk, Scotland.

Frank Russell, managing director General Refractories Co., Ltd., Auldam House, Worksop, Notts, representing the Refractories Association.

Arthur Ryner, managing director, International Processes Ltd., 3 Grosvenor Gardens, Victoria, London S. W. 1.

J. A. E. Wells, Edgar Allen & Co., Ltd., Sheffield.

Harry Winterton, William Cummings & Co., Ltd., Moorlands, Milngavie, representing the Refractories Association.

John Shaw, Brightside Foundry & Engineering Co., Ltd., Sheffield.

Thomas Firth, Jr., Brightside Foundry & Engineering Co., Ltd., Sheffield.

J. H. Booth, director and works manager Barker Perkins, Ltd., Westwood Works, Peterborough.

### From Italy

Ing. Carlo Vanzetti, president Italian Foundrymen's Association, managing director Fonderia Milanese di Acciaio, Corso Concordia 1, Milano.

Comm. Rag. Carlo Bonade'Bottino, foundry proprietor, Via Perrone 14, Torino.

Comm. Antonio Galtarossa, director Soc. Fratelli Galtarossa and president Industrial Federation of Verona, Via Caprera 1, Verona.

Carlo Garrone, managing director Fonderia Garrone, Torino.

Luigi Carlo Gualco, foundry proprietor, Torino.

Ing. Gino Modigliani, managing director Societa Olivetti, Ivrea.

Ing. Gr. Uff. Amedeo Pellicciotti, president S. A. Fabbrica Molle ed Accessori per Rotabili "FRAM", Torino.

Ing. Franco Ratti, Soc. Franchi & Gregorini di Brescia, Via Dante 4, Milano.

Ing. Agostino Rocca, Dalmine Steelworks, Milano.

Ing. Emilio De Benedetti, executive commission General Industrial Confederation of Italy, Via Morosini 18, Torino.

Ing. Comm. Ugo Fano, managing director Fonderia Nebiolo, Corso Valentino 13, Torino.

### From Luxemburg

Raymond Henry, chief engineer rolling mills and foundries, Soc. An. Ougree-Marihaye, Rodange.

H. Coqueugnot, managing director Societe Metallurgique Aubrives-Villerupt, 3 Avenue Marie-Therese, Luxemburg.

### From Netherlands

T. J. Brons, official representative Co-operative Society of Dutch Iron and Steel Founders, N. V. Appingedammer Bronsmotorenfabriek, Appingedam.

W. H. Boom, managing director N. V. G. Dikkers & Co., Hengelo (O).

W. H. Nieuwenhuijs, foundry manager and Mr. Stork, managing director Machinenfabriek Gebrs. Stork & Co., Hengelo (O).

### From Spain, Sweden and Switzerland

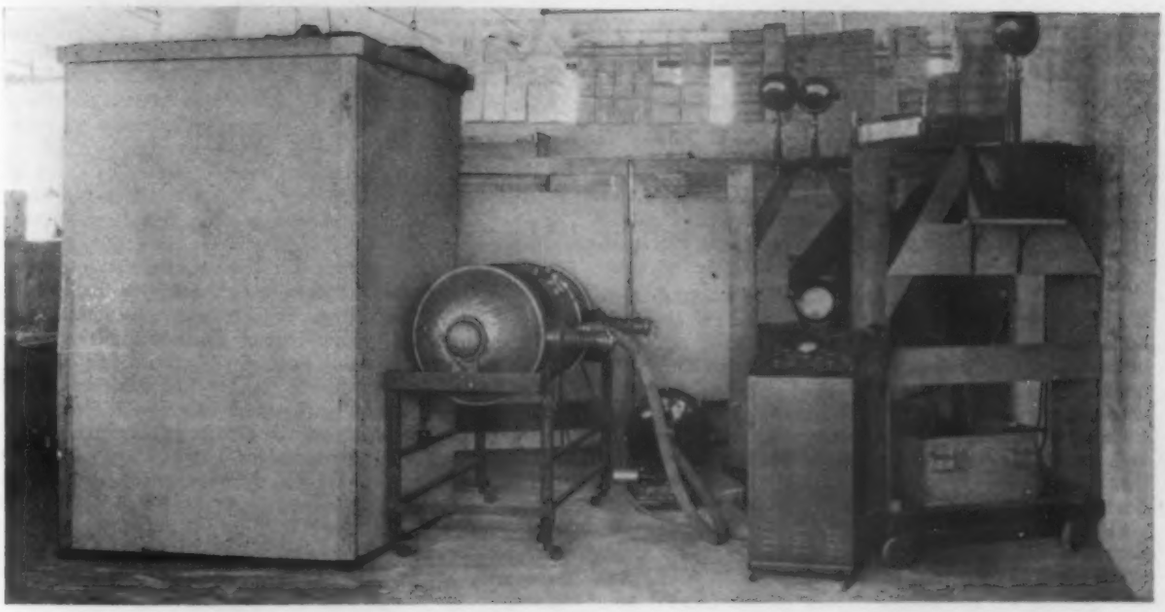
Don Jose Iturrioz, of Ajuria y Aranzabal, Vitoria.

C. C. Braun, Regaringstrasse 84, Stockholm.

Mr. Aebi, Societe Aebi & Co., Berthoud.

Mr. Bucher Guyer, Neider Weningen, Zurich.

Paul Hegi, Fonderie Hegi & Co., Oberbourg, near Berthoud.



# Mobile X-Ray Equipment

## Castings, Welds and Metals Can Now Be Examined Where Located—Lead-Lined Room Unnecessary

BY DR. ANCEL ST. JOHN*

IN contemplating the use of X-ray methods for technical problems, it is important to bear in mind that the rays produce serious physiological effects if they fall on any part of the body frequently or for a long time. Moreover, the voltage required to excite the rays is very high. It is therefore necessary to provide means for protecting the operators and workmen, who may be in the vicinity, against high voltage electric currents and exposure to such rays.

This may be accomplished by placing the entire equipment, except the control panel, in a lead-lined room. If the lead be ¼-in. thick, there is no danger of the escape of injurious rays from the most powerful equipment now available. And if the lead lining be properly grounded, there is no danger from high potentials. The installation at the Watertown Arsenal is of this type. The one just being completed at the United States Bureau of Standards is a modification of this type in which the power plant and X-ray tubes are placed in the lead-lined room and the objects to be examined are set up outside of windows in the wall of the room, and surrounded by lead shields which cut off the transmitted and scattered rays.

A third alternative is to inclose the X-ray tube in a lead-covered box or drum, of the proper shape and size, to give ample high-tension insulation and X-ray protection and to provide screens around the power plant and high-tension connections. The X-rays are permitted to escape through windows of convenient size and shape and, after traversing the articles under examination, are absorbed by properly placed lead shields. The author adopted this type of installation when he began X-ray work 20 years ago, being among the first to use it. He has used it consistently ever since; has secured most satisfactory results in radiography, in fluoroscopy and in crystal analysis, and has never injured himself nor any one else through scattered radiation or otherwise.

An installation of this type may be either fixed or mobile. That constructed by the author at the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., is of the fixed type. A Wappler "Bellevue" model X-ray machine is placed in a screened mezzanine above the X-ray dark room, and the high-tension leads are carried through the mezzanine floor directly to the tube shields. By a system of high-tension switches the power plant can be connected at will to a crystal analysis outfit, operating at 30,000 volts or to a radiographic and fluoroscopic outfit capable of operating at 120,000 volts. The equipment in the author's laboratory, also in Long Island City, is of the mobile type.

In the accompanying illustration, the component parts are shown just before completing the high-tension connections. In the laboratory this is done through the permanent aerial system attached to the ceiling. Elsewhere a set of ⅜-in. brass tubing is carried directly from the terminals of the power plant to the terminals of the tube drum.

The outfit is an adaptation of equipment originally developed for medical service, consisting of a 280,000-volt X-ray machine on the right, a tube drum in the center, and a "home-made" dark-room cabinet on the left, together with a control stand for the power plant and a blower for cooling the drum. Each unit is mounted on large casters and can be moved about at will. If necessary, the entire outfit can be transported to another locality with comparative ease. Thus a similar outfit has been withdrawn from service, transported several miles, reconnected and used in routine inspection on commercial work within 24 hours.

In addition to mobility, an installation of this type has three other major advantages. In the first place, a lead-lined room, large enough to accommodate the equipment and leave space for handling articles to be examined, may alone cost as much as all the X-ray equipment. In the second place, it permits fluoroscopic examination, which is impossible in the lead-lined room as the operator must not be exposed to the rays. In many cases fluoroscopic examination is sufficient and expensive radiography is eliminated. In the third place, if heavy articles are to be examined the outfit can be placed so that they can be handled by the shop cranes, instead of requiring special means of transportation and handling. Hence, both first cost and operating cost may be materially less with the mobile, inclosed tube installation.

*Consulting physicist, 505 Fifth Avenue, New York.

# British Institute Visits Sweden

## Iron and Steel Men Hold Joint Meeting with Jernkontoret and Discuss Many Technical Matters

STOCKHOLM, SWEDEN, Aug. 29.—The autumn meeting of the Iron and Steel Institute was held in Stockholm on Aug. 27 and 28. There was a good gathering but, owing to the anxiety caused by the industrial troubles in England, the number of members attending was not so large as would have been the case in a more tranquil industrial period. Many British ironmasters look upon Sweden as the source of the industry, and in that sense regard the country and its metallurgical developments with interest.

For some years the Swedish iron and steel industries have been at a standstill, but the makers are doing their best, by new and improved methods, to produce still higher qualities, and in a more economical way. At present, however, only one-third of the iron works are in operation and severe competition is felt in the Swedish markets from Germany, Belgium and France, and to some extent from Czechoslovakia.

### Output and Foreign Trade

Production of iron and steel during the first six months of the current year amounted to 640,300 tons, as compared with 640,100 tons in the current period of 1925. This production embraced 231,400 tons of pig iron, 174,600 tons of ingot metal and castings, 160,600 tons of rolled and hammered steel and iron, 37,600 tons of Bessemer and Thomas ingots, 21,900 tons of crucible and electric ingots and 14,200 tons of blooms and rough bars.

Imports of iron and steel during the period under review totaled 155,501 tons, against 127,689 tons in the first half of last year. During the same period exports of iron ore aggregated 3,163,928 tons, against 3,869,121 tons in the same period of 1925, while those of iron other than pig iron, iron sponge or scrap, amounted to 67,936 tons and 81,476 tons respectively. Iron and steel exports totaled 91,682 tons only, compared with 125,193 tons in January-June, 1925.

Plans are now on foot for combining the iron and steel manufacturing resources and centralizing production. The Svenska Handelsbanken have acquired a controlling interest in the Fagersta works and it is intended that the latter shall form the basis of a collaborative organization of a number of iron works controlled by the bank, i.e., the Gimo-Österby, Horndal and Kloster works and probably two or three smaller concerns. The first step to be undertaken is the reconstruction of the Fagersta and Gimo-Österby works.

### Meetings Held in Nobles' Palace

The business meetings of the institute were held in the Palace of the Nobility, where formerly Peers of the Realm held their sessions. This is an imposing seventeenth-century building in the late renaissance style. The hall in which the institute meetings were held possesses many interesting features, the walls being almost wholly covered by the Nobles' escutcheons, with arms and motto emblazoned on copper.

Jonas C. Kjellberg, president of Jernkontoret, welcomed the members in the name of the Swedish Ironmasters' Association and K. Huldt, president of the Association of Swedish Engineers and Architects, joined in the welcome, which Sir W. Peter Rylands, president of the Iron and Steel Institute, acknowledged. He then announced that, as a mark of appreciation, the council had decided to elect Mr. Kjellberg an honorary member of the institute. A telegram was sent to the King of Sweden, expressing sympathy with him on account of the Queen's illness, and the reading of the papers then proceeded as follows:

The Swedish Ironmasters' Association, known as Jernkontoret, is an institution of a unique character, without exact parallel elsewhere. A highly interesting account of its foundation, objects and development was given by its managing director, Emil Kinander.

Founded in the early part of the eighteenth century, the primary object was to render financial assistance to Swedish ironmasters in times of crisis. The movement sprang mainly from the desire of the ironmasters to free themselves from financial dependence on their foreign customers, to whom members were then in debt, a condition which was taken advantage of to depress the price of Swedish iron.

The Government granted the right to the associated works to open a credit at the State Bank at 4 per cent interest against iron held for export, and the account paid as interest was repayable immediately to the works by Jernkontoret. Jernkontoret was empowered also to buy iron when necessary, and to hold it until market conditions became favorable for its disposal. The association acquired funds by levying a tribute on every buyer of iron. The regular revenue at first consisted of some 30,000 crowns a year, raised by annual levy on the associated works, who thus became partners of the association according to the extent of their yearly output of forged iron, based on the average production of the previous three years.

In addition, a certain portion of the revenue set aside each year was invested to strengthen the lending capacity of the association, and to permit giving support to the technical side of the industry. The revenue from accumulated funds now exceeds, ten times over, the amount of the contributions of the firms, who still continue to pay the levy of 2½ öre (0.67c.) on each hundred-weight of bar iron and forgings produced. Works producing pig iron only were not admitted until 1918. The total assets at the beginning of this year stood at about 9,400,000 crowns ($2,520,000), and the total annual revenue is approximately $180,000.

### Loans Obtainable by Members

Firms which have a partnership in the association can obtain "advance loans" at 4½ per cent interest up to five crowns for every hundred-weight of iron for which the works is a partner. "Building loans" are granted to any single partner against approved security, to an amount not exceeding $26,700, at 6 per cent interest. Jernkontoret's technical and educational mission dates from 1451, in which year the famous iron metallurgist, Sven Rinman, was appointed chief smelting master. The total amount paid in subventions for scientific research, experiments and technical education now amounts approximately to $48,600 a year. The position of chief engineer to Jernkontoret was created in 1903, the first occupant being J. A. Brinell. On his retirement in 1914 he was succeeded by A. Wahlberg, who still holds that office.

In 1751 the great gold medal of Jernkontoret was founded for bestowal on men who have achieved special merit in the Swedish iron industry. Another medal "for real ability in the iron trade" is awarded in silver to especially capable foremen and workmen. Jernkontoret is housed in its own building, which is ornamented externally by a frieze representing the development of the Swedish iron manufactures, and with a number of medallion portraits of famous Swedish metallurgists.

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### *Thirty Years' Development of the Swedish Iron Industry*

Under this heading was presented an extremely interesting paper by A. Johnsson and A. Wahlberg. The invention by Rogers in 1820 of the basic lining in

the puddling furnace, and other metallurgical developments, caused the Swedish iron industry to lose its position as a chief supplier in the world's markets; but the introduction of the Bessemer and open-hearth processes worked with basic linings enabled Sweden to profit by making high-grade soft steel.

The Swedish iron industry is mainly still based on the ores of Central Sweden, which are very low in phosphorus and sulphur. The concentration of low-grade ores is combined with agglomeration of fine concentrates. The ores now used are crushed in a stone-breaker, ground in a ball-mill, treated by wet magnetic separation, and the fine concentrate agglomerated by briquetting or sintering. The last processes are, however, as a rule carried out at the blast furnaces.

### Water-Power Used Extensively

Extensive use is made of hydroelectric energy in the production of pig iron and steel. In 1923 Sweden produced 52,148 tons of ordinary electric pig iron with a consumption of energy of 132.2 million kwhr. and 1,331,464 hectoliters of charcoal. On a yearly production of 500,000 tons of pig iron, exclusively electric, there would be a saving of 18 million hectoliters of charcoal, that is, 18 million crowns.

If electric power could be obtained at 0.8 öre (0.22c.) per kwhr., the cost of the power would amount to 10 million crowns, and the real saving to 8 million crowns, apart from interest and depreciation. This calculation shows that it would be an economy to substitute electric furnaces for blast furnaces, provided the electric energy can be obtained at a reasonable [?] price. During 1923, the electric power produced was only 9.1 per cent of what could be obtained.

The inside dimensions of ordinary blast furnaces are in the main unchanged, except that the diameter of the hearth has been increased a little and the stock has been lowered somewhat, resulting in a lower bosh. When new furnaces have been built or old ones rebuilt, the height of the stock has been increased, to diminish the consumption of charcoal and increase the output. Formerly the hearths almost always had a rammed lining of crushed quartz and fireclay, but are now mostly lined with silica brick or fireclay brick.

### Open-Hearth Process Advancing

The development of Swedish steel making is marked by the decline in the Bessemer process, whereas the open-hearth process has largely expanded and electric steel making has come into use to some extent. A strong point in favor of the open-hearth was that an outlet was found for the use of the high-quality scrap from the Lancashire and Bessemer processes, which formerly was sold abroad, as a rule to England and America.

Furnace hearths nowadays are made somewhat longer [and shallower] than formerly for the same size of charge. Through this means the heat is more easily transmitted to the charge, and the oxidation is more rapid. A more rapid oxidation is obtained also by placing gas and air ports side by side, instead of the air ports above the gas ports. Less sulphur is supposed to be taken up from the gas, when the ports are placed side by side, for the reason that the gas has been practically all burned before it comes in contact with the metal.

The supply of wood for fuel has proved insufficient, and there is an increasing use of mineral coal in the gas producers, especially for the basic open-hearth. A special Swedish type of coal gas generator has been developed, known as the Tholander generator. It is cylindrical, 1.5 meters (5 ft.) in diameter, with a circular step-grate; the blast enters in the center, under the grate.

At some works the blast is pre-heated up to 200 deg. C. (392 deg. Fahr.) in an iron pipe recuperator placed in the chimney flue. This recuperator also furnishes the necessary steam from gradually injected pure water. Slagging is done by hand. The producers are as a rule placed close to the furnace, with one or two for each furnace. The flow of gas to the furnace is directed by the melter by regulating the air supplied to the producer.

A cold charge is always used where quality steel is produced. The charge is tapped when the desired carbon has been reached. Recarburization is not used. Additions of ferromanganese, etc., are always made in the furnace, except for cheap steel, where the ferro may be added in the ladle. The Enlund electric resistance method or the Malmberg magnetic method is used for ascertaining the amount of carbon present, each of which gives a very exact determination of carbon in a few minutes. It is possible by these means to follow the decarburization of the bath, and the number of off-charges is thereby reduced to a minimum.

The steel is cast into ingots usually 250 by 300 mm. (9.84 by 11.81 in) in cross section. A sinkhead is used for killed carbon steel, and this is often provided with a circular groove so that it can be broken off by a blow before the ingot is rolled. For the protection of the ingot molds the very hot high-carbon steel is often poured through a tun-dish, placed under the nozzle of the steel ladle. This tun-dish is provided with one large hole and several smaller holes, dividing the stream of metal into several smaller streams.

*Emil Kinander, managing director of Jernkontoret, whose address gave an account of the association and its objects*

Ingot molds are coated on the inside with tar, partly for the protection of the mold and partly to obtain by evaporation a protective covering of gas around the steel while pouring. By these precautions, it is possible to get a high-carbon steel ingot without surface defects. Softer steel is poured direct from the ladle into the molds, and any surface defects are renewed by chipping. The molds are used with the wide end up, so as to prevent the pipe from extending through the whole ingot. Bottom casting is in general use for plate ingots, and ingots of low-carbon effervescing steel are cast narrow end up.

### Increasing Use of Electricity

Electric furnaces are in use for the production of some high-alloy steels. These are smaller than open-hearth furnaces, being 1 to 4 tons capacity; usually they are electric arc furnaces of the Rennerfelt or Héroult type, but a few works use induction furnaces. All material is charged cold, except in one place, where there is a larger electric furnace installed for refining basic Bessemer steel.

The most prominent feature in the development of the rolling mills is the use of the electric motor for mill driving. The direct-current motor has been adopted at new mills because it permits a wide range of speed variation while rolling, besides giving an efficiency of 90 to 95 per cent at all speeds. All plate mills built during the last decade are, with one exception, two-high reversing mills. As to sheet mills, the only changes are heavier housings and larger roll necks than formerly.

### Annealing Furnaces

Of the different types of annealing furnaces using gas, mention is made of a furnace where the annealing

box is heated directly by the flame from a number of burners placed along the two sides of the furnace. The gas enters horizontally through small openings, and the air vertically through corresponding openings at the spring of the roof arch. The burners are arranged in sections, with valves for regulating the gas and air for each section. The burning gas surrounds the box and the waste gases leave at the ends of the furnace through flues under the furnace bottom. The air is heated to about 200 deg. C. in a simple and strongly built brick recuperator. This annealing furnace, which is used with good results at two of the larger steel works, is easy to build, cheap to manage and gives a very uniform temperature up to 600 deg. C. (1112 deg. Fahr.).

The resolution to limit armament construction has dealt a severe blow to the Swedish iron industry and new markets are difficult to find, so that the exportation of pig iron is only a small proportion of what it was before the war. Sweden must depend more than ever upon her home market, but even this is limited and prevents the building of large modern rolling mills. Thus, for instance, a ten-days' rolling would be sufficient for America's largest rail mill to supply all the rails Sweden requires in a whole year. The prospect of once more building up a paying production of ordinary steel and iron depends largely upon whether Sweden gets a reasonably protective tariff or not.

Optimism in regard to the future is based on the belief that there is always likely to be an increased demand for high-class steel in the world, and for the production of such steel Sweden is well fitted because of her pure and suitable iron ores, her charcoal supply and her cheap water-power, which can be used both for producing mechanical energy and for metallurgical purposes.

### *Swedish Iron Mining Industry*

W. Petersson gave an account of the development of the Swedish mining industry during the last quarter-century. This has been accompanied by a more thorough survey of the ore deposits, with the aid of scientific methods, and the knowledge of the iron ore resources of Sweden is much increased now, both as regards the quantities available and the nature of the ores. The present producing capacity of the Swedish mines is about 10,585,000 tons of lump ore and about 1,227,500 tons of concentrates per annum, representing about 7,500,000 tons of pure iron.

Out of the total, in 1,773,300 tons of ore, the prosphorus content is below 0.005 per cent; in 603,200 tons, 0.006 to 0.010 per cent; in 2,237,500 tons, between 0.011 and 0.06 per cent; in 1,559,400 tons, between 0.061 and 0.8 per cent, and in 5,639,100 tons more than 0.8 per cent. From these figures it is evident that the Swedish iron mining industry could easily meet a demand for a much higher production than that which corresponds to the present consumption.

### *Chromium and Iron-Chromium Alloys*

Frank Adcock gave an account of an investigation made at the National Physical Laboratory into the conditions under which nitrogen is absorbed by iron, chromium and iron-chromium alloys. Nitrogen is rapidly absorbed by chromium in the liquid state, and alloys containing up to 3.9 per cent nitrogen are readily obtained. When nitrogen is passed for a considerable time over the surface of molten iron, only 0.02 per cent of nitrogen is retained.

Alloys of iron-chromium, both in the liquid and the solid states, take up nitrogen at high temperatures and the quantity of nitrogen in the alloys increases with the chromium content. In alloys of composition near 12 per cent chromium, nitrogen gives rise under proper conditions to a martensitic type of structure closely resembling that of iron-carbon alloys.

The hardness of these alloys can be modified by heat treatment, and ranges from about 115 Brinell in the annealed state to 315 Brinell when quenched above the critical range. The pearlitic or lamellar type of structure of the alloys with 20 to 30 per cent chromium containing nitrogen is known to be absent from the corresponding pure iron-chromium alloys. The addition of 0.05 per cent carbon to a 28 per cent chromium alloy shows no signs of a lamellar structure in the furnace-cooled material.

### *Anomalies in Heat Conduction in Spherical Steel Specimens*

In response to a request from the industrial side, the Metallografiska Institut (Stockholm) made some determinations of the heat conductivity of two steel specimens, and a report on the subject was presented by Carl Benedicks, H. Bäckstrom and P. Sederholm. A method was successfully worked out for the accurate determination of small temperature differences, using a differential galvanometer with full compensation.

Considerable local variations in the temperature differences (in one case extending from 1 to 8.5) were found to occur in spherical steel specimens, which were centrally heated. The occurrence of these variations was corroborated by other methods; they were found also to occur in electrical resistivity, though to a much smaller degree (1 to 1.05). The microstructure also showed some variations. The fact that the local variations in (apparent) heat conductivity are far more considerable than the variations in electrical conductivity or other properties is explained by the fact that the apparent heat conductivity of a metal must be due to thermo-electrical convection currents which cause a considerable heat transfer by the Thomson effect (or by the "general electro-thermic effect"). This transfer is considerable in large masses and results in an unequal temperature distribution. The heat transfer in solid metal seems essentially to depend on electrical convection currents.

#### Ascertaining Thermal Conductivity

In Part II of their report the authors describe at some length a method for the determination of thermal conductivity in carbon steel specimens. As a first approximation, a fairly close connection between thermal and electrical resistivity was found to exist and the thermal resistivity of carbon steel is expressed by the formula:

$$1/\lambda = 4.4 + 8.7\Sigma C.$$

where $\lambda$ (thermal conductivity) is expressed in calories per cm. sec. Grade and $\Sigma C$ = carbon value in weight per cent of added elements dissolved in the iron.

This formula assigns to pure iron ($\Sigma C = 0$) the value $\lambda = 1/4.4 = 0.227$ calories per cm. sec. Grade, which hitherto has not been obtained. At all events, the purest iron tested (0.08 per cent carbon) gave as high a value as 0.187, which ought to replace the value sometimes given for pure iron, $\lambda = 0.135$. The individual influences exerted on $\lambda$ by the added dissolved elements were ranged in the following order: nickel, manganese, hardening carbon, aluminum, silicon—thus indicating that the thermal conductivity of iron is lowered least by 1 atomic per cent of nickel, more by nickel, more by manganese and so on. Cementite carbon exerts only a slight influence on $\lambda$.

#### *Discussion*

Dr. Cecil H. Desch remarked that the paper is of considerable interest from the practical point of view, as well as in connection with the theory of conduction, but the matter must be threshed out by physicists before a reliable method can be devised. He said that the mechanism of thermal conduction is much more complicated than electrical conduction.

Dr. W. H. Hatfield said that anxiety need not be felt in regard to discrepancies, for when these are disclosed in experimental investigations it generally means that something of consequence is going to be discovered. He hoped that the authors would persist in their work, which is of importance to the steel works metallurgist. He thought the figure, 0.187, for the purest iron tested rather high and that 0.1428, as given by other workers, was nearer the mark.

### *Mechanical Properties of Four Heat-Treated Spring Steels*

G. A. Hankins, D. Hanson and Miss S. W. Ford were the joint authors of a report on the mechanical

properties of spring steels, which subject is being investigated at the National Physical Laboratory. The test results for 0.6 per cent carbon steel were good, although the quenching temperature required for complete hardening is high. In the case of 0.8 per cent carbon steel, there were no marked differences in mechanical properties for two quenching temperatures, but at 900 deg. C. (1650 deg. Fahr.) a more uniform material is produced than at 830 deg. C. (1525 deg. Fahr.).

For silico-manganese steel, water-quenched material appears to be slightly superior to oil-quenched material. Chrome-vanadium steel tempered at 600 deg. C. (giving Brinell number 400), combines a high Izod value and good reduction of area, with a fatigue limit of about 42.5 tons per sq. in.

*Jonas C. Kjellberg, president of Jernkontoret, the Swedish Ironmasters' Association, who welcomed the British visitors*

*Discussion*

E. H. Saniter suggested that the steels on which the analyses were made were not representative of the steels made for springs in Great Britain, being too pure. It is not usual for 0.6 carbon steel to be quenched in oil and certainly not at so high a temperature as 950 deg. C.

C. E. Stomeyer said that the experiments described in the paper confirm the view that spring steel, stressed to the limit of proportionality, is likely to fail. He described an alternative method of determining fatigue limit values.

### *Testing of Hardened Steel*

Axel Lundgren described the results of a method devised in the Government Testing Institute, Stockholm, to determine the mechanical qualities of hardened tool steel more rapidly than is possible by means of practical cutting tests. The method includes bending tests, determination of limits of proportionality, elasticity and ultimate strength, as well as impact and hardness tests.

Steels with 1.3 and 1.0 per cent of carbon respectively, annealed in such a manner that the cementite is developed in a fine grained form, show, with subsequent hardening and tempering, a higher bending strength and a higher impact resistance than specimens which, before hardening, have been annealed so that more coarse-grained cementite has developed. Steel with 0.9 per cent carbon, at all quenching temperatures and with tempering up to 280 deg. C. (535 deg. Fahr.) shows the lowest bending strength of all the steels tested.

#### Bending Strength Suffers

With increased quenching temperature all the steels tempered at 150 and 200 deg. C. show a reduced bending strength. When examining the relation between hardness, bending strength and impact resistance at 765 deg. C. quenching temperature, it is found that, with the highest hardnesses, steel with 1.3 per cent carbon possesses a greater bending strength and impact resistance than the other steels. With lower hardnesses, all show approximately the same bending strength.

Impact resistance, above a certain hardness, is greatest for steel with 1.3 per cent carbon, after which the steel with 1 per cent carbon possesses the greatest impact resistance up to a certain hardness. The influence of the rate of cooling upon the ultimate bending stress after tempering has been tested with a tempering temperature of 300 deg. C. In this connection it has been found that, in the case of very rapid cooling in benzine, a much lower bending strength is obtained than in the case of a less rapid cooling in air.

*Discussion*

Dr. W. H. Hatfield pointed out that the paper contains no indication of the kinds of steel employed. He thought it would be interesting to know by what metallurgical processes the steel under investigation was made.

### *Treatment of Steel with Ferro-Carbon-Titanium*

G. F. Comstock (Niagara Falls, N. Y.) described what is being done with ferro-carbon-titanium and gave an outline of the practical results being obtained by its use. He claimed that the value of ferro-carbon-titanium lies in its being a good deoxidizer, more powerful qualitatively than silicon, and one that does not make steel dirty when used. In effervescing steel it corrects over-oxidation conveniently, maintaining the cleanness of the metal and not hindering the effervescence. In killed steel it gives more complete deoxidation, without dirtiness, and prevents serious segregation.

Like every other alloy, it must be used properly to give good results. It must not be expected to cure defects which no deoxidizer could overcome. The author referred to his contribution to THE IRON AGE (Dec. 4, 1924, page 1477) in which he showed that the use of titanium as the final deoxidizer instead of aluminum secures better ductility in steel castings. He added that titanium treatment of cast steel gives a better elastic ratio, probably on account of the clean steel, and a more feathery microstructure as cast, so that grain refinement by annealing is more easily accomplished and more complete.

### *Carburization and Decarburization of Iron*

Arvid Johansson and Rutger Von Seth (Stockholm) described experiments regarding carburization and decarburization of iron, also regarding the surface decarburization of steel, although the latter investigation has not yet been concluded. The equilibra of the reaction $3\,Fe + 2CO \rightleftarrows Fe_3C + CO_2$ have been determined between 700 and 1100 deg. C. In pure nitrogen at 1050 deg. C. no decarburization has been found other than that presumably depending on the influence of gases as well as oxides in the steel.

### *Cause of Temper Brittleness*

Prof. J. H. Andrew and H. A. Dickie are investigating the physical changes concerned in the phenomenon of temper brittleness. Their work so far covers specific volume and Brinell hardness determinations on various steels, in their tough and brittle states. From the data obtained it has been clearly shown that variations, depending on the rate of cooling from the tempering temperature, are produced in these characteristic properties.

An explanation has been advanced to account for the phenomenon of temper brittleness. It has been suggested that $\alpha$-iron (which may be nickel or chromium ferrite) may, at higher tempering temperatures, dissolve an appreciable amount of carbide, which, on quenching, is retained in solid solution. On slow cooling, however, the carbide is re-deposited at the grain boundaries, giving rise to a brittle network throughout the mass. The effect of special elements on the physical properties and microstructure has been dealt with at some length and further confirmation is provided of the remarkable changes in specific volume, and also

in hardness, which can be brought about by tempering nickel steels at high temperatures.

### *Electrochemical Potentials of Carbon and Chromium Steels*

Carl Benedicks and Robert Sundberg (Metallografiska Institut, Stockholm) reported on the electrochemical potentials of some carbon and chromium (stainless) steels in different conditions, which occur:

(a) in a neutral (0.82-N) ferrous sulphate solution, carefully purified from free oxygen; "H-potential"; $E_h$.

(b) in the same solution in a partly oxidized state, obtained by the addition of a definite quantity of hydrogen peroxide; "O-potential," $E_o$.

$E_h$ possesses, in all cases examined, a higher, i.e., more negative, or baser value than $E_o$. The purest iron investigated was found to give (for a 1-N ferrous sulphate solution) $E_h = -0.708$ volt; at a very low carbon content, $E_o$ was found to be approximately $= -0.62$ volt.

For carbon steels the following results were obtained:

(a) In unquenched specimens, $E_h$ is slightly lowered with increasing carbon content up to 0.9 per cent; then a slight rise occurs.

(b) Quenching lowers the $E_h$ values of a given steel; $E_h$ is lowered with increasing carbon content down to $E_h = -0.686$ volt for 1.35 per cent carbon.

(c) For unquenched specimens, $E_o$ was found to rise considerably, though in an irregular way, with increasing carbon content up to 0.9 per cent.

(d) Quenching raises the $E_o$ values of a given carbon steel.

(e) The difference between $E_h$ and $E_o$ tends to vanish with an increasing carbon content as well as with increasing temperature; thus a differential aeration will exert a very slight influence on a high-carbon steel, if hardened at a sufficiently high temperature.

For chromium (stainless) steels, the following points may be noted: (a) for unquenched specimens (containing 0.04 to 0.08 per cent carbon), $E_h$ rises considerably on the addition of 8 per cent chromium, the potential then being sensibly baser than that of iron or carbon steel. On further addition of chromium, a lowering of $E_h$ takes place, which is particularly prominent when the chromium content reaches 13 to 14 per cent. With still higher chromium content, $E_h$ rises again. At a constant chromium content of 13 per cent, $E_h$ is lowered considerably by an increasing carbon content. (b) In quenched specimens, $E_h$ rises with increasing chromium content, but is materially lowered for steels containing about 13 per cent chromium, by an increasing carbon content, down to a value as low as —0.55 volt. For unquenched specimens, $E_o$ possesses a remarkably constant value, $E_o = +0.31$ volt, which is unaffected by chromium (beyond a content 8 per cent) and by carbon. (d) In the quenched specimens containing 0.04 to 0.08 per cent carbon, $E_o$ is lowered to —0.64 volt at 8.05 per cent chromium, and generally to +0.31 volt for higher chromium contents. In the quenched specimens containing about 13 per cent chromium, $E_o$ varies between +0.275 and +0.308 volt.

A "stainless" steel (carbon 0.10, chromium, 13 per cent) immersed in 1-N potassium chloride solution was found to assume temporarily a higher, or active, potential. Thereby a visible rusting occurred. The action of light probably exerts some influence on the rusting of iron.

## Seattle Rolling Mill Installs Electric Furnace

The Northwest Steel Rolling Mills, Inc., Ballard, Wash., will soon resume the rolling of steel bars, following a shut-down for a few months during which time a Moore electric furnace has been installed. The furnace installation will be completed by Oct. 1. The company has a 16-in. roughing mill and a 10-in. finishing mill, with monthly capacity of about 1200 tons of bars, and two oil-burning furnaces for casting small ingots. Herman Goetz is sole owner of the plant.

## New Lens for Welders

Immunite is the name given a new welding lens being placed on the market by Strauss & Buegeleisen, 30 Front St., Brooklyn, N. Y. This lens is ground with optical precision and polished to a plane. At the same time it is stated to be a good filter for injurious light rays and to meet the requirements of current United States Navy specifications.

It can be ordered and specified by shade numbers. Each piece bears a certificate giving its absorption of ultra-violet, infra-red, visible and total energy transmitted.

## A New Cyclops Steel Co.

The Cyclops Steel Co., Inc., has been organized under the laws of Pennsylvania, by interests closely identified with the Universal Steel Co. Bridgeville, Pa., and will operate the plant and conduct the business formerly carried on in the name of the Cyclops Steel Co., Inc., of New York and for a few months recently under the name of Charles T. Evans, Lessee. The plant is situated at Titusville, Pa., and the new company will continue the manufacture of high speed and all other grades of tool steel, as well as special heat and corrosion resisting steels.

The old company, started in 1884, was placed in a receivership Aug. 7, 1924, and operated by the receivers until Feb. 1, this year, when the material was sold and the plant leased to a syndicate. On June 14, last, the plant was sold under foreclosure proceedings to bondholders, from whom the new company purchased it.

The plant comprises four crucible furnaces (114 pots), using producer gas from four Swindell producers; one 1000-lb. Moore Lectromelt electric furnace; 16 heating furnaces; one 12-in. and one 10-in. 3-high 6-stand bar mills; four annealing furnaces; four hand pickling tanks and 10 steam hammers of capacities ranging from 500 lb. to 10,000 lb. The rated capacity of the plant is 9800 tons of steel ingots.

## Commemorates Hundredth Anniversary

The Collins Co., Collinsville, Conn., maker of axes, machetes and edge tools, has issued an attractive volume to commemorate its 100th anniversary. The work is profusely illustrated, the frontispiece being a cut of Samuel W. Collins, one of the founders of the firm. The firm was formed by two brothers, Samuel W. and David C. Collins, and their cousin William Wells. The manufacture of axes was begun in what was then known as South Canton, now Collinsville.

The present officers of the concern are: Charles L. Taylor, Hartford, president; Albert E. Newton, Collinsville, vice-president and general manager; Meigs H. Whaples, Hartford, treasurer; Clayton S. Jenkins, Collinsville, assistant treasurer; and F. Spencer Goodwin, Hartford, secretary. The late Charles Hopkins Clark, Hartford, was a vice-president.

The property of the Indianapolis Steel Products Co., New Palestine, Ind., a suburb of Indianapolis, will be offered for sale. F. J. Wolfe, of Goodman & Wolfe, liquidators, Terre Haute, Ind., has been appointed receiver by the Superior Court of Vigo County, Ind. The New Palestine plant was recently completed and consists of a new 10-in. mill, motors, shears, boilers, pumps and other equipment, a steel building, 100 x 300 ft., and 14 acres of ground.

# Improved Equipment at New Haven

## Machines in Operation on Production Work—Technical Sessions Also Feature Machine Tool Exhibition

MORE than 80 manufacturers of machine tools and other shop equipment were represented at the sixth annual New Haven Machine Tool Exhibition, held at Mason Laboratory, Yale University, New Haven, Conn., Sept. 7 to 10.

Although the number of exhibitors was fewer by six or eight than last year, the attendance was regarded as satisfactory. At a meeting of the general committee, which is made up of representatives from Yale University, the New Haven Chamber of Commerce and the New Haven section of the American Society of Mechanical Engineers, and is headed by H. R. Westcott, it was decided to hold the exhibit next year on Sept, 6, 7 and 8. It is planned also to have admission during the day by ticket, the general public to be admitted to the exhibition during the evenings only. It is understood that several of the companies which exhibited this year have made reservation for 1927.

Technical sessions under the auspices of the machine shop practice division of the A. S. M. E. were a feature as heretofore, these sessions being held in Dunham Laboratory, Yale University, on the mornings of Sept. 7, 8 and 9. Afternoons were given over to meetings of the various A. S. M.E. standardization committees, and a symposium on "What's New in the Machine Tool Industry" was held on the evening of Sept. 9. Among the meetings also was a testimonial dinner attended by about 30 representative engineering educators and industrialists, given to Dexter S. Kimball, dean of the college of engineering, Cornell University, and president of the American Engineering Council.

An outline of the exhibits of shop equipment, most of which was demonstrated on production work, is given below. Some of the papers presented at the technical sessions are also abstracted.

## Outlines Possibilities of Cold-Press Finishing of Metal

AN outstanding contribution to the technical sessions held during the machine-tool exhibition was a paper on "The Cold-Press Finishing of Metals," by E. V. Crane, staff engineer, E. W. Bliss Co., Brooklyn, N. Y. The paper presents a comprehensive outline of the production possibilities in cold squeezing or working of metals in compression under power presses. It was given at the session held Sept. 10, under the chairmanship of W. F. Dixon, works manager Singer Mfg. Co., Elizabethport, N. J.

Squeezing steel cold, it was pointed out, is the severest of all press-working operations, as the working pressure may climb to 100 tons or more on the surface of the product. Applications of the cold squeezing of metal in power presses were discussed under four classifications, arranged according to the severity of the operation. First, and usually the least severe, is the mere sizing, flattening or surfacing of forgings, stampings or castings, which involves little reduction of thickness. Second, is swaging, cold forging or upsetting, where a suitable blank or slug is forced into a desired shape to save machining operations. This usually involves considerable reduction of thicknesses in some portions, but characterized by considerable unrestricted freedom of flow.

Third is coining, stamping or embossing, where the metal, pretty well confined and usually of comparatively thin section, may be forced to flow to fill the shape and profile of the dies. Fourth is extrusion where the metal is forced to flow plastically through an orifice, being otherwise confined. Because the latter process is quite limited as to metals and applications, it was not discussed in the paper.

### Drop Forgings Sized Rapidly in Knuckle Joint Press

In sizing work, the most general application of the cold squeezing process was said to be in the sizing of drop forgings. Several unfinished forgings on which flats, angles or boss faces were squeezed to size in knuckle-joint type presses, eliminating the usual milling or grinding operations, were shown by means of lantern slides. The usual tolerance for such work was said to be plus or minus 0.001 in. The dies for sizing bosses are usually plain blocks with comparatively large surface area so that the forging need not be located with special care. It was stated that under favorable conditions one operator and one press can size cold from four to ten times as many parts as can be milled or ground by one operator with a suitably rigged machine.

The forgings to be sized may have a number of different finish surfaces at varying levels, which are taken care of by corresponding steps in the die. It was also pointed out that sizing of forgings is not limited to the flat surfaces of bosses, but that rounds, levels, sides, tapers, flanges, even the inner surfaces of punched holes can be sized accurately. Having ample space for the free flow of metal and not restrict it so that the pressure builds up, was a caution emphasized, particularly in sizing steel. A certain amount of restriction is possible when necessary, but it demands greater care in the construction of the die and the life of the steels is proportionately reduced. Forging a depression in the center of the bosses was said to reduce the area, and to prevent pyramiding of pressure at the center, which is hard on the dies in the case of a large-area squeeze, and localizes any deformation at the ends of the boss. It was stated that presses of 400, 600 and 800-ton capacity have proved to be the most satisfactory for the general run of automobile forgings.

### Castings Cold Sized and Surfaced

Many brass, bronze, aluminum and alloy steel castings as well as some steel and malleable castings were said also to lend themselves to cold sizing and surfacing methods. In the case of brass there is an increasing tendency to employ hot press forging for many shapes, the accuracy of which can be held very nearly as close as obtained by cold sizing. Another application of coining methods to castings is in the preparation of some classes of hardware for plating. It was stated that the surface of the casting can be coined sufficiently smooth to eliminate or greatly reduce the preparatory hand-work and buffing.

Between mere sizing, flattening and surfacing of forgings, stampings or castings and swaging, cold forging or upsetting there are a variety of squeezing and sizing jobs on which either the pressure required is not great or accuracy is not essential. Several such jobs were described and illustrated.

In the second classification, swaging, cold forging, etc., combining close accuracy and severe working stresses, are a number of odd-shaped pieces squeezed to shape out of solid metal. Press swaging an adding machine wheel, and a collection of samples to illustrate the possibilities of this method were included in the

paper. It was to be noted that on all of the samples shown, the blank is designed so that as little metal as possible has to be squeezed down for trimming or shaving out the finished piece. It was also to be noted that in the pieces having a boss, hub or other portion higher than the rest of the metal around it, there is a tendency to drag down the corners and edges of those higher parts. This tendency is minimized by using a medium hard stock, and if necessary, arranging the dies to strike the high part at the end of the stroke to size it off. There may be considerable variation in the pressure required for this work because of the area and thickness relation. It was said that for practical cases, with a free flow relief all around, it is well to figure 100 tons per sq. in. and higher on the total area squeezed for steel and around 75 tons per sq. in. for copper.

### Coining, Stamping and Embossing Jobs

A number of examples under the third classification of cold squeezing (coining, stamping, embossing, etc.) were illustrated and discussed. This classification includes a variety of work in which the metal is made to flow comparatively little, but is subjected to high pressures to bring out sharp designs or lines or to obtain a very accurate surface. On most of this work the metal is either completely contained in a closed die, with little or no outlet or relief for the flow of surplus metal. Under such conditions, if oversized stock is used or adjustments made carelessly, the pressure may build up to several hundred tons per sq. in. with serious consequences to the equipment. One of the samples of this class of work was a decorative cover plate coined to resemble a job previously done by etching with acid. It was cited as a severe job in steel, and was done on a 100-ton knuckle joint press.

Selection of too light a press, improper planning of operations so that the local pressures cut down the life of the dies, and suitable steel for the dies themselves were said to be among the difficulties experienced in the type of work described in Mr. Crane's paper. A partial table of steels, with trade names and analyses for cold swaging dies are included in the paper, and others were mentioned by Mr. Crane in the discussion. The life of the tools for this kind of work was said to vary, under normal conditions, between 20,000 to 40,000 pieces per grinding. It was said to have been found that the life of some steels could be prolonged materially by redrawing them at the redressing periods to or above their original drawing temperatures. Another "stunt" found to prolong the life of simple shaped dies was said to be in electroplating a thin, hard, smooth layer of chromium (0.001 or 0.002 in.) over the die steels. It was stated to be advisable, especially when brittle steels are used, to pay careful attention to stiffness both in the press bed and in the die holder, even backing up the die steels with other hardened plates to prevent deflection which might permit cracking.

The characteristics and design of knuckle joint presses were discussed and various types of automatic feeds were outlined. On sizing operations, good hand-feeding practice was said to range between 10 and 30 pieces per min.; in swaging and coining operations the work usually has to be placed accurately and the rate is lower, 5 to 15 per min. Where production is large enough to warrant it, the application of mechanical feed on almost any of this work materially increases output.

D. A. Chason, methods and equipment engineer, Singer Mfg. Co., Elizabethport, N. J., in his discussion of Mr. Crane's paper, stated that ample experience with die work and knowledge of the construction of presses was very essential to success in this class of press work. He cautioned against loading up pressure on the dies in order to save an operation, saying that this was a common mistake of inexperience. Attention should be given, he said, to keeping the dies as well as the work clean.

### Gear Research Progress Report Submitted

At the same session a progress report of the A. S. M. E. special research committee on gears was submitted by J. E. Nicholas, assistant instructor, Massachusetts Institute of Technology, Cambridge, Mass. The report, under the title of "The Influence of Elasticity and Errors in Tooth Shape on Stresses in Gears," was presented in abstract by Prof. Earle Buckingham, also of the Massachusetts Institute of Technology.

The report is an abstract of a thesis which describes the first series of tests and the results obtained on the special gear-testing machine designed by Wilfred Lewis, president of the Tabor Mfg. Co., Philadelphia, for use in studying the effect of varying degrees of tooth accuracy and varying velocities on the strength of gear teeth. The paper, preprinted by the society, includes a description of the machine and outlines the method of determining errors and the making of load velocity tests. The effects of velocity on load, of errors, of elasticity, of tooth form, of masses and of loads are discussed in successive sections, and a number of tables and graphs are included.

The elastic properties of the materials were found to have marked influence. It is stated that from the present incomplete series of tests it would seem that the loads developed by a given error varied directly as the modulus of elasticity of the material of which the gears are made. It is stated in the concluding paragraphs of the report that the noise of a pair of gears seems to be directly proportional to the extent of error. The noisiest pair of meshing gears while running was that having the largest error. With same error and different materials the noise is not as great. In the discussion of the report, suggestions were made as to further lines of research. Among those entering the discussion were G. M. Eaton, chief mechanical engineer Westinghouse Electric & Mfg. Co., East Pittsburgh; Wilfred Lewis; and Henry J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J.

# Discuss Motor Drives, Apprenticeship and Other Topics

"UNLESS all of the operating conditions are known, it is difficult to decide which would be the better of the two methods, except for certain specific applications," said F. H. Penney, industrial engineering department, General Electric Co., Schenectady, in a paper on "Group Drive and Individually Motorized Drive," presented at the opening technical session, Sept. 8.

The individually motorized tool is gaining in favor for a great many, if not most, applications, said Mr. Penney. However, for a miscellaneous collection of tools, such as frequently found in medium-sized machine shops, both types of drive have their place. It was pointed out that many factors enter into the problem and that only when all of the conditions are known can the correct decision be made. Some of the advantages and disadvantages of both types of drives were discussed, and applications of each type to machines of various classes were shown by lantern slides. It is planned to abstract this paper in a forthcoming issue of THE IRON AGE. C. R. Burt, general manager of the Pratt & Whitney Co., Hartford, was chairman of the session.

Mobile artillery ammunition formed the basis of discussion in a paper under the title of "Sane Specifications and Intelligent Inspection," which was presented by Brig. Gen. C. L'H. Ruggles, assistant chief of ordnance, United States Army, Washington, at the technical session held Sept 8. This class of ordnance material was selected because of its requirements for large mass production and the special considerations required for satisfactory functioning. Some of the principal difficulties experienced during the World War were summarized, and the steps by which it was hoped to assure "sane specifications and intelligent inspection" were outlined.

The working out of designs and specifications which are proper compromises between the quality and quan-

tity production viewpoints was stressed as the present problem of the Ordnance Department, and the assistance of practical manufacturers was said to be needed in this work. The requirements to be met in designing artillery ammunition were taken up, and the effect of varying certain important dimensions beyond the present limits was shown by the aid of comparative target record charts based on actual tests made on a large number of 155 mm. projectiles.

What is being done by the Ordnance Department to liberalize its requirements and thus facilitate production was outlined, and the functioning of the district office system, by means of which the department is brought in close touch with the manufacturers in the various districts who must be depended upon to furnish material in an emergency, was explained.

The steps being taken by the Ordnance Department to assure "sane specifications and intelligent inspection" were given as follows:

> 1. The complete development of ordnance material and the preparation of specifications, so as to make unnecessary numerous changes during manufacture. 2. The accurate determination of the effect of large and small tolerances on the various dimensions of a shell and the determination of the correct tolerance that can be permitted without unduly affecting the range and accuracy of the projectile. 3. The preparation of specifications and drawings in a standard form, complying as nearly as possible with the best commercial practice. 4. Definite plans for training in ordnance work the district office executives and the chief inspectors, and the selection of carefully trained and experienced men for assignment to this work in an emergency. 5. The preparation of factory war plans in peace time. 6. The establishment of close contacts with manufacturers through the district office system which will eventually place the Ordnance Department designs and specifications on a sound basis for quality and quantity production.

### Less Decoration on Machine Tools

The process of elimination of the ornate in machine design was interestingly shown by Dr. Dexter S. Kimball, dean of the college of engineering, Cornell University, in an address on "Decoration and Proportion in Machines" at the technical session held Sept. 9. As a machine becomes more purposeful, he said, it becomes more beautiful. Decoration is not needed and it adds needlessly to the cost of manufacture.

Dean Kimball's address was illustrated by numerous lantern slides, which contrasted early and recent models of a variety of tools and machines. The design of these tools and machines was shown to have gone through one or all of the following stages: Utility or inventive stage, decorative stage, and stage of beauty of purpose. The progress through these stages is in one or two ways empirically as in the case of the axe and the scythe handle, or through scientific design, as in the case of the automobile. From the pictures of early and recent models of sewing machines, typewriters, locomotives and machine tools, it was shown that these machines have passed through all of these stages of design.

### Apprenticeship Discussed

Another paper for presentation at this session was on "The District Apprenticeship System," by H. S. Falk, vice-president and works manager of the Falk Corporation, Milwaukee. Because of Mr. Falk's absence, the paper was read by title.

Trade training was discussed at the same session by H. S. Fall, director of the State Trade School, New Britain, Conn. A point stressed was that if we are to have trained individuals in industry, we must have a specific organization to give that training, and it is necessary that someone be responsible for the training. He approved Mr. Falk's plea for recognition of the formation of the district scheme in State and nation, and said that a larger number of apprentices was necessary for the perpetuation of our crafts. A significant factor in the success of the Milwaukee plan was, he said, the thorough cooperation of the industrial plants, public schools and other agencies.

In outlining some of the basic principles of a good training plan, Mr. Fall said that the training should be directly connected with the work the boy is going to follow. To be effective, training should be given along the line of the individual's aptitude, it being stressed as of primary importance that the boy's aptitude should be ascertained and developed. Effective training, it was said, can be given only by a master craftsman, and one who has the ability to impart what he knows. Instruction must be given under conditions that obtain in industry. Cooperation with the schools in one's community was urged, as well as active work in helping to establish respect for industrial careers.

Carl Dietz, president of the Bridgeport Brass Co., and chairman of the meeting, stressed aptitude study as of prime importance.

### Production Milling at Evening Session

At an evening session held Sept. 9, W. W. Tangeman, sales manager, Cincinnati Milling Machine Co., Cincinnati, presented a paper on "The Necessary Requirements of Production Milling," and C. T. Appelton, sales engineer, Heald Machine Co., Worcester, spoke on "Recent Developments in Internal Grinding." "Recent Developments in the Application of Tapered Roller Bearings to Machine Tools," by S. M. Weckstein, industrial equipment engineer, Timken Roller Bearing Co., Canton, Ohio, and "Electric Arc Welding," by E. vom Steeg, Jr., General Electric Co., New York, were other papers at this session.

"Giving Steel Tools a Chance," was the title of an address by F. R. Palmer, Carpenter Steel Co., Reading, Pa., given at a meeting of the New Haven chapter of the American Society for Steel Treating, Wednesday evening, Sept. 8. The meeting was held in a building adjacent to the machine tool exposition and C. J. Sauer, Heppenstall Forge Co., Bridgeport, was chairman. The attendance included visitors to the exposition.

# Machines of Late Design Demonstrated on Production Work

THE exhibition of machine tools was held in Mason Laboratory, Yale University, as in previous years, and as heretofore the tools displayed were for the most part of new or improved design and were shown in actual operation. More than 80 companies were represented.

### Introduces New Radial Drill

One of the largest exhibits was that of Henry Prentiss & Co., New York, the machines of more than seven builders being shown. A center of interest in this group was a new "Super-Service" 5-ft. radial drill of the Cincinnati Bickford Tool Co., Cincinnati, features of which include incorporation of all speeds in the head, power rapid traverse, single lever arm control, power column clamp, centralized control, automatic oiling and tapered roller bearings. It is planned to describe this new machine in a forthcoming issue of THE IRON AGE.

Several machines of the Avey Drilling Machine Co., Cincinnati, were in operation. Included was a new model No. 3 single-spindle machine with motor spindle, and a No. 1½, two-spindle unit equipped with a new spindle guard, consisting of a coiled spring which telescopes within itself.

The V. & O. Press Co., Hudson, N. Y., among other machines, exhibited its No. 41 N notching press equipped with a new friction clutch and raising and lowering attachment for the die. The machine operates at 600 r.p.m. Other machines in the space of the Henry Prentiss company included a No. 2 full universal lathe of the Acme Machine Tool Co., Cincinnati; a No. 2 centerless grinder and a No. 4 vertical miller of the Cincinnati Milling Machine Co., Cincinnati; a motor-driven automatic chucking machine of the Goss & DeLeeuw Machine Co., New Britain, Conn., and a 10-ton broaching and assembling hydraulic press of the Oilgear Co., Milwaukee.

Several machines were also shown in the space of Purinton & Smith, Hartford. These included the new vertical type general purpose drilling machine of the Kingsbury Machine Co., Keene, N. H., described in our issue of Sept. 9, and a new type E B universal double-end drilling and tapping machine with automatic indexing fixture. Among other machines J. D. Wallace & Co., Chicago, ex-

hibited a new portable electric hand saw for stock up to 2¼ in. A junior bench lathe, designated as the No. 507, with attachments, was a new item of the Rivett Lathe & Grinder Corporation, Boston, and among several hand blocks and hoists of the Yale & Towne Mfg. Co., Stamford, Conn., was a new 2-ton electric chain hoist for foundry use. Sensitive control is a feature and the hoist may be arranged for one or two speeds. A 16-in. helical geared head tool room lathe of the Monarch Machine Co., Sidney, Ohio, was shown and also a No. 33 vertical spindle surface grinder of the Abrasive Machine Tool Co., East Providence. Leon J. Barrett, Worcester, demonstrated a centrifugal oil extractor and dryer and a Cyclone dryer for small metal parts. Sawing machines of the Peerless Machine Co., Racine, Wis., portable electric drills and grinding machinery of the Black & Decker Mfg. Co., Towson, Md., and electrically driven drills, grinders and other tools of the Wisconsin Electric Co., Racine, Wis., were also to be seen in the space of Purinton & Smith.

### New Production Tool

A 6-in. four-spindle Mult-Au-Matic, developed recently by the Bullard Machine Tool Co., Bridgeport, was also a center of interest. This tool is similar to the company's previous model, but is only 104 in. high and is contained within a circle 48 in. in diameter. The Warner & Swasey Co., Cleveland, had its new 3A, 7½-in. bar capacity universal hollow hexagon turret lathe in operation, and the Potter & Johnston Machine Co., Pawtucket, R. I., demonstrated its No. 6D manufacturing automatic chucking and turning machine.

A 1-in. model C, five-spindle Acme automatic screw machine and a ⅞-in. model G, four-spindle Gridley were exhibited by the National Acme Co., Cleveland, self-opening dies and collapsible taps being also shown. Three machines were on production work in the space of the New Britain Machine Co., New Britain, Conn. These were the No. 12-A three-spindle automatic chucking machine of the work rotating type; the No. 652 New-Matic chucking machine and the No. 226, 1 x 5 in. sextuple automatic bar machine.

A 3¼ in. model H bearing machine, available in milling slide or turret type, and intended for machining bearing races from forgings was a new tool shown by the Cleveland Automatic Machine Co., Cleveland. The company's model J double-end threading, pointing, turning or drilling machine with hopper type magazine, was also under power.

The Brown & Sharpe Mfg. Co., Providence, exhibited its No. OOG screw machine with new motor drive arrangement, the motor being mounted on the front of the machine and driving through a gear reduction. A new 2A universal milling machine with double overarm was among other machines, and a large number of cutters and small tools were displayed.

Several companies were represented in the space of the Botwinik Brothers, New Haven. Among the new tools shown was a No. 1 pinion cutter of the Sloan & Chace Mfg. Co., Newark, N. J., a feature of which is the new magazine feed. A No. 1 automatic gear cutter, with redesigned tailstock, oil pan and pump, was also exhibited; as well as a No. 6 precision bench lathe with headstock bearings of tool steel and of two taper type. One of the new line or reclinable power press, of the Zeh & Hahnemann Co., Newark, N. J., described in THE IRON AGE of Sept. 2, was also shown. Other machines at this booth included lathes of the Carroll & Jamieson Machine Tool Co., Cincinnati, portable electric tools of the Hisey Wolf Machine Co., Cincinnati; spot welders of the Ames Co., Brooklyn, N. Y.; keyseaters of the Davis Keyseater Co., Rochester, and band saws of the Draver Mfg. Co., Richmond, Ind.

### Improved Model of Automatic Tool Room Machine

Among the tools exhibited by the Keller Mechanical Engineering Corporation, Brooklyn, N. Y., was an improved model of its type BL full automatic tool room machine. Features include the commutator feed for drilling, and vernier scales, horizontal and vertical, for the precision locating without the use of fixtures. An 18-in. engine lathe with full ballbearing headstock was displayed by the Cisco Machine Tool Co., Cincinnati. The Leland-Gifford Co., Worcester, had several drilling machines in operation and the Frew Machine Co., Philadelphia, had several machines on display. A broad line of portable electric tools was shown by the James Clark, Jr., Electric Co., New York. A number of sawing machines were exhibited by the Racine Tool & Machine Co., Racine, Wis.

Several types of grinding machines were to be seen. The Size-Matic internal grinder of the Heald Machine Co., Worcester, brought out within the year, was demonstrated, and two sizes of a new oscillating grinder were among the machines exhibited by the Van Norman Machine Tool Co., Springfield, Mass. The Sickle automatic universal cutter grinder being marketed by L. Sichel, New York, was in operation. Abrasive wheels and a portable sander having three speeds to permit the sanding of wood and metal parts were exhibited by the Carborundum Co., Niagara Falls, N. Y.

A new rapid production marking machine was shown by the Noble & Westbrook Mfg. Co., Hartford. This unit, available in bench and pedestal types is intended for marking names and patent dates on tubes and other cylindrical work up to 3¾ in. in diameter. The table of the machine rotates continuously and the work to be marked is placed on pins projecting from it. As the work passes the stationary die it is marked and then ejected automatically. Production is said to be at the rate of 6000 to 8000 marks per hr.

### Variety of Presses Shown

The E. W. Bliss Co., Brooklyn, N. Y., had several machines in operation, including a wire nail machine, a flat joint trimmer and an end punching press. Inclinable and other presses were also shown. A high-speed blanking press of recent development was displayed by the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Among the tools exhibited by the Standard Machinery Co., Auburn, R. I., was a No. 4 swaging machine equipped with air feed, which is intended to minimize fatigue of operator in production work. A 200-lb. drop hammer with magazine feed was demonstrated in embossing cylinder lock keys, production being at rate of 52 per min. Inclinable power presses with motor-drive arranged so that the motor serves as a belt tightener were among other presses shown, and ball and roller bearings were on display. Swaging machines, including a new model of the No. 4 unit with individual motor mounted overhead were exhibited by the Torrington Co., Torrington, Conn. A large number of samples of swaged pieces were shown, and also a full line of ball bearings.

Three sizes of its motor-driven automatic nut tapping machines were in operation in the space of the National Machinery Co., Tiffin, Ohio, and a number of machines, including the No. ½ universal iron worker and the No. ½ power bending roll, were demonstrated by the Buffalo Forge Co., Buffalo. Several of the company's "breeze coolers" were used in various parts of the exposition building. The Taylor & Fenn Co., Hartford, exhibited three sizes of its spring presses. Lo-Hed hoists were shown in operation by the American Engineering Co., Philadelphia. Products of the Pennsylvania Pump & Compressor Co., were shown by L. D. Burke, New Haven.

### Exhibits of Small Tools and Gages

The exhibit of optical devices for machine shop use by the Bausch & Lomb Optical Co., Rochester, was noteworthy. Included was the company's toolmaker's microscope, an optical comparative indicator, a centering level and an optical leveling protractor.

Among other tools, the Geometric Tool Co., New Haven, exhibited its new KD rotary die heads and class S taps, recently described in THE IRON AGE. The Eastern Machine Screw Corporation, New Haven, also had an extensive display of die heads. The O. K. Tool Co., Shelton, Conn., had an attractive display of tool holders, lathe and planer and other tools, and demonstrated its inserted tooth cutters in connection with a Rockford Rigidmil.

### Welding Equipment

In addition to machine tool motors and controls, a tool room furnace and melting pots, the General Electric Co., Schenectady, exhibited arc welding equipment. Welding supplies and equipment were also shown by the Oxweld Acetylene Co., Long Island City, N. Y., and by the Air Reduction Sales Co., New York. The Machinery Dealers, New Haven, exhibited a 6-kw. Acme spot welding machine. Several types of gas furnaces were shown by the New Haven Gas Light Co., New Haven.

Ball bearings were attractively displayed by several companies including the S. K. F. Industries, Inc., New York; Fafnir Bearing Co., New Britain, Conn.; New Departure Mfg. Co., Bristol, Conn.; Norma-Hoffman Bearings Corporation, Stamford, Conn., and the Bantam Ball Bearing Co., Bantam, Conn. Roller bearings were exhibited by the Timken Roller Bearing Co., Canton, Ohio.

Bearium bearings of the Bearium Bearings Co., Buffalo, were demonstrated at the booth of C. S. Mersick & Co., New Haven, where a full line of gear products of the Boston Gear Works Sales Co., Quincy, Mass., was also shown. The J-B Engineering Co., New Haven, displayed Cleveland worm reduction gears.

Safety set screws and steel belt fasteners were among the products exhibited by the Bristol Co., Waterbury, Conn. The Clipper Belt Lacer Co., Grand Rapids, Mich., was also represented. Samples of cast cams, cast twist drills and other cast and forged tools were exhibited by the Dycast Steel Co., Collinsville, Conn.

# Continental Markets Gain Strength

## British Offer High Prices for Semi-Finished—Plan of International Cartel Outlined —Further Japanese Tariff Increases Expected

*(By Cable)*

LONDON, ENGLAND, Sept. 13.

PIG IRON is strong with stocks of Cleveland foundry exhausted and only two furnaces in blast. Hematite continues firm with stocks dwindling and one Northeastern furnace blowing. Business generally is quiet as a result of the uncertainty of the coal situation. Steel mills are well sold, some having six months' work booked, so that they are not keen sellers for forward delivery except at advanced prices. There is a fair volume of inquiry, however, mostly from domestic consumers.

August exports of pig iron totaled 12,562 tons, of which the United States took 50 tons. The total exports of iron and steel were 163,684 tons.

Continental markets are strong on good demand from British consumers coupled with the prospect of formation of an international cartel. Further definite information on the international negotiations is lacking.

Tin plate is firmer as a result of increased interest in forward delivery in anticipation of an early settlement of the coal strike. There is a moderate volume of export inquiry but business is still generally quiet. Galvanized sheets are quiet but steady. There is some inquiry for black sheets from Japan but few orders have been placed.

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## BELGIAN PRICES FIRMER

### Heavy Export Selling Gives Mills Backlog—British Demand Advances Semi-Finished Prices

ANTWERP, BELGIUM, Aug. 21.—Despite the small volume of business as a result of the summer dullness, prices on all products are well maintained and in a few instances there is a definite upward tendency. Foreign buyers evidently have more confidence in the future than at any time this year and the recent fluctuation of prices and general instability of the market seem to have disappeared. While export purchasing is smaller than a few weeks ago, there is still a good volume of foreign business and most mills are booked ahead for three to four months.

Buyers show little disposition to seek concessions from the current schedule of prices but efforts of Luxemburg mills to advance the market have been unsuccessful and it seems to be generally admitted that any upward movement of prices might seriously curtail business. Foreign prices show the same upward trend as Belgian, with the exception of occasional low quotations from Germany. Domestic business is dull, buyers and sellers continuing to entertain different ideas of price as a result of the fluctuating exchange. Consequently, the immediate future of the market seems to depend largely upon the increase or decrease of export demand.

**Coke.**—The market is firm with half washed syndicate coke at about 200 fr. ($5.40) per metric ton, compared with the recent level of 175 fr. per ton. As high as 215 fr. and 220 fr. per metric ton is reported obtainable in the open market.

**Pig Iron.**—Both domestic and export demand is satisfactory and prices firm. On domestic business, furnaces are booking business up to 610 fr. per metric ton ($16.50), f.o.b. furnace. Resale iron, however, is still available at the recent level of 585 fr. per ton. Export to the United Kingdom, as a result of the coal strike, continues large with transactions at £3 9s. and £3 10s. per metric ton ($16.90) f.o.b. Antwerp. Supplies of iron for prompt shipment are small. Hematite ranges from 725 to 750 fr. per ton (about $19.90) f.o.b. furnace, which is slightly lower than the quotation of British hematite, being offered in small quantities at £4 7s. to £4 8s. c.i.f. Antwerp. No medium phosphorus foundry iron is being produced.

**Semi-Finished Material.**—The prolonged coal strike in England is maintaining an active demand from British consumers of semi-finished products. Prices, in consequence, continue to move upward placing Belgian mills, which buy in the open market, in a difficult position.

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**British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.86 per £ as follows:**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Durham coke, f.o.b. | £2 | 10s. | | | | $12.15 | | |
| Bilbao Rubio ore† | 1 | 0 | to £1 | 0½s. | | 4.86 | to | $4.97 |
| Cleveland No. 1 fdy. | 4 | 14½ | | | | 22.96 | | |
| Cleveland No. 3 fdy. | 4 | 12 | | | | 22.36 | | |
| Cleveland No. 4 fdy. | 4 | 11 | | | | 22.11 | | |
| Cleveland No. 4 forge | 4 | 10½ | | | | 22.00 | | |
| Cleveland basic (nom.) | 3 | 15 | and | 3 | 15½ | 18.23 | and | 18.35 |
| East Coast mixed | 4 | 3 | | | | 20.17 | | |
| East Coast hematite | 4 | 3½ | | | | 20.29 | | |
| Rails, 60 lb. and up | 6 | 15 | to | 7 | 5 | 32.80 | to | 35.23 |
| Billets | 6 | 10 | to | 8 | 0 | 31.59 | to | 33.35 |
| Ferromanganese | 14 | 0 | | | | 68.04 | | |
| *Ferromanganese | 14 | 0 | | | | 68.04 | | |
| Sheet and tin plate bars, Welsh | 6 | 5 | | | | 30.37 | | |
| Tin plates, base box | 1 | 0½ | to | 1 | 2¼ | 4.98 | to | 5.65 |
| Black sheets, Japanese specifications | 13 | 15 | to | 13 | 17½ | 66.83 | to | 67.43 |
| | | | | | | C. per Lb. | | |
| Ship plates | 7 | 10 | to | 8 | 0 | 1.62 | to | 1.73 |
| Boiler plates | 9 | 15 | to | 11 | 0 | 2.11 | to | 2.39 |
| Tees | 7 | 15 | to | 8 | 5 | 1.68 | to | 1.78 |
| Channels | 7 | 0 | to | 7 | 10 | 1.41 | to | 1.62 |
| Beams | 6 | 15 | to | 7 | 5 | 1.46 | to | 1.57 |
| Round bars, ¾ to 3 in. | 7 | 12½ | to | 8 | 2½ | 1.65 | to | 1.76 |
| Steel hoops | 10 | 10 | and | 11 | 0* | 2.28 | and | 2.39* |
| Black sheets, 24 gage | 11 | 5 | to | 11 | 10 | 2.44 | to | 2.49 |
| Galv. sheets, 24 gage | 16 | 5 | to | 16 | 10 | 3.52 | to | 3.58 |
| Cold rolled steel strip, 20 gage | 13 | 0 | | | | 3.51 | | |

*Export price.
†Ex-ship, Tees, nominal.

### Continental Prices, All F.O.B. Channel Ports

| | (Per Metric Ton) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Foundry pig iron: (a) | | | | | | | | |
| Belgium | £3 | 11s. | to | £3 | 12s. | $17.25 | to | $17.50 |
| France | 3 | 11 | to | 3 | 12 | 17.25 | to | 17.50 |
| Luxemburg | 3 | 11 | to | 3 | 12 | 17.25 | to | 17.50 |
| Basic pig iron: (a) | | | | | | | | |
| Belgium | 3 | 4 | to | 3 | 5 | 15.55 | to | 15.80 |
| France | 3 | 4 | to | 3 | 5 | 15.55 | to | 15.80 |
| Luxemburg | 3 | 4 | to | 3 | 5 | 15.55 | to | 15.80 |
| Coke | 0 | 18 | | | | 4.37 | | |
| Billets: | | | | | | | | |
| Belgium | 4 | 15 | to | 5 | 0 | 23.08 | to | 24.30 |
| France | 4 | 15 | to | 5 | 0 | 23.08 | to | 24.30 |
| Merchant bars: | | | | | | C. per Lb. | | |
| Belgium | 5 | 4 | to | 5 | 6 | 1.14 | to | 1.16 |
| Luxemburg | 5 | 4 | to | 5 | 6 | 1.14 | to | 1.16 |
| France | 5 | 4 | to | 5 | 6 | 1.14 | to | 1.16 |
| Joists (beams): | | | | | | | | |
| Belgium | 5 | 1 | to | 5 | 10 | 1.11 | to | 1.21 |
| Luxemburg | 5 | 1 | to | 5 | 10 | 1.11 | to | 1.21 |
| France | 5 | 1 | to | 5 | 10 | 1.11 | to | 1.21 |
| Angles: | | | | | | | | |
| Belgium | 5 | 5 | | | | 1.15 | | |
| ⅛-in. plates: | | | | | | | | |
| Belgium | 6 | 0 | to | 6 | 2½ | 1.32 | to | 1.35 |
| Germany | 6 | 0 | to | 6 | 2½ | 1.32 | to | 1.35 |
| ⅛-in. ship plates: | | | | | | | | |
| Belgium | 5 | 12½ | to | 5 | 15 | 1.24 | to | 1.26 |
| Luxemburg | 5 | 12½ | to | 5 | 15 | 1.24 | to | 1.26 |
| Sheets, heavy: | | | | | | | | |
| Belgium | 6 | 3 | to | 6 | 4 | 1.33 | to | 1.34 |
| Germany | 6 | 3 | to | 6 | 4 | 1.33 | to | 1.34 |

(a) Nominal.

The offering prices of British buyers for prompt shipment are continually higher. Current prices are about £4 8s. 6d. ($21.70) per metric ton for blooms, £4 12s. ($22.55) per ton for billets and £5 ($24.50) per ton for slabs, all f.o.b. Antwerp.

**Finished Material.**—A large measure of confidence has evidently returned to buyers and the market has been gaining strength since early in the month. While there are still the usual efforts by buyers to secure concessions from the originally quoted prices, when mills refuse to make any reduction, the order generally is placed. Aided by sizable export orders most mills are well booked for three to four months. In export business, occasional lower prices are encountered but underselling by foreign competitors is not as serious as in the past. Offers by exporters of £4 18s. 6d. per ton, f.o.b. Antwerp on steel bars have not been accepted by mills and the market is apparently firm at £5 ($24.50) per metric ton, with beams at £4 18s. 6d. ($24.15), angles and channels at £5 ($24.50) and reinforcing bars at £5 10s. ($26.95) per ton. Wire rods are about £5 7s. 6d. ($26.35), f.o.b. Antwerp.

## MORE GERMAN SHEETS TO JAPAN

### Japanese Mills Claim American and European Steel Is "Dumped"—Further Increase of Tariff Expected

TOKIO, JAPAN, Aug. 18.—British labor troubles have injected new life into the Japanese market for black sheets. England has been forced to temporarily quit the field, America is getting a larger share of the business and Germany, from a poor third, has taken the lead.

For the first four months of the year imports of black sheets into Japan averaged about 21,500 tons a month, while normal consumption in the Empire ranges between 15,000 and 17,000 tons. The excess was largely caused by efforts to lay in heavy stocks before the new tariffs became effective at the end of March. The oversupply on the market, however, depressed prices and brought on a period of poor business. Galvanizers lost sums ranging from 50,000 yen to 200,000 yen as their inventories declined. In addition, there was a strike in Osaka, which increased the cost of local production by 10 sen a sheet.

In May, 21,565 tons of black sheets were imported. England accounted for 11,000 tons, the United States 9000 tons and Germany 800 tons. In June Japan imported 18,390 tons of black sheets. Of this total 12,000 tons came from England, 5000 from the United States and 1400 from Germany. Although definite figures for July are not available, England has dropped out of the market, due to the shut-down of her steel industry, caused by the coal strike, and Germany has surpassed the United States and taken the lead. The import total, however, is below that of pre-coal strike days and the market has caught up with the excess stocks. Prices are rising, although they have not yet reached the mark attained in January.

Japanese steel works realize that there is a large undeveloped field for black sheet manufacture here and are making plans to take advantage of it. The Kawasaki Dockyard is installing machinery with which it hopes to raise its present output of 38,000 tons a year to 200,000 tons by next June. As a matter of fact, installations and additions now being made will force Japan to go into the export market unless there is a decided increase in local consumption.

For the last month or so Japanese steel producers have been complaining about "dumping of American and European steel." They have demanded that the Government invoke the anti-dumping law and protect them, as they professed themselves unable to compete. The Ministry of Commerce and Industry ordered an investigation, the results of which were announced on Aug. 14, and has reported that there is no appreciable dumping. It is planning to increase the tariffs on steel products instead.

The steel producers cited the fall of prices in the black sheet market as one outstanding evidence of dumping. Last October these were quoted at 94.70 yen a ton. Now they are quoted at 69.18 yen a ton, about 27 per cent lower. They make no reference to the increased value of the yen during the period under review. Since last October it has gone from $40 to $47.75 per 100 yen, a gain of almost 20 per cent. The dollar price at $40 was $37.88. Now it is about $33.03. Other steel products have gone off about 15 yen a ton, or 19 per cent, closely paralleling the rise in exchange.

The Commerce Ministry wishes to protect Japanese steel, however, and intends to introduce a bill in the next session of the Diet, convening in December, raising the steel tariff still more.

The Iron and Steel Consulting Commission in the Ministry of Commerce and Industry has appointed a committee which will study steel conditions in Europe and America, in order to prepare a new tariff bill which will really protect Japanese producers.

Foreign steel imported into Japan last year, according to a report just issued by the Consulting Commission, amounted to 81,041,000 yen and 460,000 tons, divided as follows:

| From | Yen Value | Tons |
|---|---|---|
| China | 40,000 | Unknown |
| England | 27,584,000 | 135,000 |
| Germany | 16,832,000 | 142,000 |
| Belgium | 4,225,000 | 44,000 |
| Switzerland | 878,000 | 3,000 |
| United States | 30,003,000 | 123,000 |

Imports from England consisted principally of black sheets, those from the United States of tubing and rails and those from Germany of bars and rods.

## PLAN OF EUROPEAN CARTEL

### Intended to Prevent Over Production but Permit Free Competition—Mills to Pay $1 a Ton

BERLIN, GERMANY, Aug. 28.—There is considerable optimism in iron and steel circles based on the expected successful formation of the International Raw Steel Syndicate at the next meeting about Sept. 17. It is pointed out that the recent Paris negotiations were more successful than had been expected and with the signatures of German and Luxemburg members already secured, France and Belgium are expected to sign by the next meeting.

The provisional quotas, based on an annual production of 26,000,000 metric tons are reported as: Germany 43.18 per cent; France 31.19 per cent; Belgium 11.63 per cent; Luxemburg 8.23 per cent and the Saar 5.77 per cent. The provisional agreement, which is now under consideration is based on a plan presented by Dr. Fritz Thyssen, in which certain alterations were made. The principal object in the agreement is to maintain elasticity. There is no restriction on maximum production and no partition of selling markets is planned. The actual sales quotas would be fixed by this plan every quarter. Each country will pay into a syndicate fund $1 for every ton of steel produced and $4 per ton on any excess of production over the quarterly quota. Should a country show a deficit of production, based on its quarterly quota, $2 a ton will be allowed from the syndicate fund to the extent of the deficit. Accounts will be settled annually, any of the fund remaining being remitted to the participating countries on the basis of their quotas.

Under this plan, it is intended to control production, determine the actual production and selling capacities of the various countries and to maintain free competition, at the same time preventing unrestricted over-production. No measures of a price fixing nature are to be employed, although it is believed that the regulations imposed will tend to maintain a reasonable price level in international markets.

While membership for the present is represented by Germany, France, Belgium and Luxemburg, the Austrian steel industry represented by the Alpine Montan A. G. will be informally linked with the syndicate through the Alpine works association with the German

Rhine-Elbe Union. Representatives of Hungarian steel works have expressed a willingness to join the syndicate and entry of Czechoslovakian and Polish mills is being discussed. The Czechoslovakian industry, particularly, has strong motives for joining, as the industry is depressed and a repartition of markets was recently made with the Austrian works.

## MORE GERMAN MERGERS

### Boiler Makers Combine—British and German Mannesmann Companies to Exchange Information

BERLIN, GERMANY, Aug. 28.—Reorganization of the Vereinigte Stahlwerke A. G. is proceeding successfully. The recent revival of both the steel and coal industries is expected to remove the necessity for discharging large numbers of employees but there will probably be considerable curtailment. Several of the western mills included in the United Steel Works have been increasing their forces in the past week.

Another noteworthy international agreement is the report that the German Mannesmann Tube Co. and the British Mannesmann Tube Co. have agreed to mutual support and exchange of technical information. The British company is an offshoot of the German company, established before the war.

Sometime in September there will be a conference of sheet producers to discuss the establishment of a Thin Sheets Syndicate, which the Siegerland and Sauerland mills have been urging. The obstacle to such a syndicate in the past has been the large quotas demanded by certain mills producing other classes of material than thin sheets.

Among boiler manufacturers, a merger has been agreed upon including Walther & Co. A. G., Cologne, the Durrwerke A. G., Düsseldorf and Jacques Piedboeuf, Düsseldorf. One of the three merging works will be closed and kept in reserve, pending a revival of business. The market has been depressed recently as a result of increasing competition from new types of boilers.

Negotiations are continuing for the formation of an electro-technical syndicate. Such an association would be directly connected with reparations deliveries and railroad electrification in France and Belgium, so that temporarily the French and Belgium electrical companies show no disposition to collaborate with the German manufacturers.

## German Bolt and Nut Makers Offer American Sizes in Gross Tons

HAMBURG, GERMANY, Aug. 26.—Following the example of German makers of bolts and nuts, who recently entered into the manufacture of their product with United States threads, certain Belgian manufacturers have adopted the United States thread on bolts and nuts exported to markets preferring this specification. According to report, however, buyers in these markets have objected to the quality.

German prices on bolts and nuts with United States threads, fixed at the end of August, are as follows, in double gunny sacks of 1016 kg., f.o.b. Hamburg or Bremen:

| Bolts | Per 100 Lb. | Nuts | Per 100 Lb. |
|---|---|---|---|
| ¼ ..... £54 | $11.70 | £61 | $12.19 |
| ⅜ ..... 41 5s. | 8.95 | 46 | 9.98 |
| ½ ..... 24 7 6d. | 6.30 | 29 | 6.29 |
| ⅝ ..... 15 15 | 3.40 | 24 | 5.20 |
| ¾ ..... 13 10 | 2.92 | 21 10s. | 4.66 |
| ⅞ ..... 12 15 | 2.75 | 19 | 4.12 |
| 1 ..... 12 | 2.60 | 17 10 | 3.79 |
| 1 ..... 11 10 | 2.50 | 17 | 3.68 |

These prices are apparently being well maintained, although a large order would bring out small concessions. The schedule is intended to apply to fair quantities of 1-in. to 10-in. bolts equally assorted. Assortments of 1-in. to 6-in. usually take an extra of 10s per gross ton and 1-in. to 3-in. an extra of £1 per ton. Orders for assortments of 2-in. to 12-in. receive a reduction of 10s and 4-in. to 12-in. £1 per gross ton.

## IMPORTERS CONTINUE ACTIVE

### Report That Dumping May Be Charged Against German Steel Not Considered Seriously —Exports Quiet

NEW YORK, Sept. 14.—The newspaper report that the mixed commission investigating alleged payment of bounties on German steel exports would present evidence of violation of the anti-dumping act is viewed as of small importance by representatives in the United States of German steel interests. It is pointed out that if any violation of the anti-dumping act is charged, France, Belgium, Luxemburg and other European countries must be included, as German prices are regulated by the necessity of meeting the low-priced competition of low exchange countries.

The major part of current inquiry for steel on which importers are quoting, continues to be for reinforcing bars. One of the largest, involving 6000 to 10,000 tons of bars for the Lake Pontchartrain bridge at New Orleans, pending for several weeks, is not expected to close for some time. The 600 tons of reinforcing bars for which the Arundel Corporation, Baltimore, is in the market, are understood to be twisted square bars. While the recent award of 4600 tons of reinforcing bars by Stone & Webster, Inc. to the Societe Anonyme Ougree-Marihaye in Belgium, represented all the current bar requirements for their share of the Conowingo project, it is reported that further purchases will probably be made next year.

It is claimed by some importers that reinforcing bars have been successfully imported under the classification of building material, paragraph 312, which takes a duty of 1/5 of 1c. per lb. or 20c. per 100 lb., whereas the bar classification, paragraph 304, calls for a duty of 3/10c. of 1c. per lb., or 30c. per 100 lb. This has not been confirmed.

Far eastern markets continue quiet with only small merchant business from Japan and China. There has been some wire rod purchasing recently by Japanese export houses, but this business continues to go to Canadian mills at about $2 per ton under the c.i.f. quotation of American sellers. Japanese consumers have recently made satisfactory purchases of wire rods in Austria.

## German World Market Prices Show Increase for September

BERLIN, GERMANY, Aug. 28.—The increase to 70 per cent of capacity by the steel syndicate for the August output has been justified as most mills have booked orders in excess of this rate. Prices continue to move upward and the September "world-market" quotations, established by the syndicate, show increases of several marks per ton over the August figures. World-market prices for August and September are as follows, per metric ton, f.o.b. Antwerp:

| Product | September Marks | August Marks |
|---|---|---|
| Ingots | 83 | 80 |
| Blooms | 88 | 83 |
| Billets | 96 | 90 |
| Slabs | 102.50 | 95 |
| Shapes | 97 | 93 |
| Bars | 100 | 96 |
| Wire rods | 112 | 112 |
| Medium sheets | 120 | 117.50 |

The Pig Iron Syndicate has made no change in its prices or selling conditions for September. In the Siegerland a considerable improvement in the ore mining industry is reported and several thousand additional workers have been employed.

Demand for structural material is small but increased business in universal iron is reported and the United Steel Works has decided to resume operation of the Thyssen universal mills.

The foreign trade balance of Germany is quite satisfactory. In the first half of the year iron and steel imports totaled 483,142 metric tons and exports 2,408,382 metric tons. The ingot production in the first half was 6,316,692 metric tons and the pig iron output 4,929,836 tons.

# Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

## Statistical Data Concerning the Chief Consuming Industries Indicate That:

**1. Current buying is keeping pace with steel production and should continue to do so for the next few months.**

**2. Railroad financial status points to probable improved equipment buying this autumn.**

**3. Building activity likely to continue large for some months.**

**4. Automobiles, helped by exports, will insure good demand for steel.**

**5. Activity in petroleum and mining industries is tending upward.**

**6. Credit extensions possibly stimulating farmer buying in face of little improvement of purchasing power.**

**7. Sustained gain in exports hardly likely.**

THE outstanding fact concerning the steel industry is the well sustained activity among the chief industries that consume steel; while the production of steel in spite of its upward trend during the last three months is little, if any, in excess of the indicated current requirements.

The composite demand line, shown in the first chart, indicates the rate of productive activity in a group of industries which ordinarily take the bulk of the iron and steel produced in this country. It thus reflects the *potential* requirements, and the fact that it is tending upward is significant. The curve turned upward in June and made a further gain in July. While we do not expect the composite demand line to rise much higher, it seems likely to continue near the present satisfactory level for some months.

### *The Promise of Railroad Buying*

UPON the activity of the industries represented by this barometer, in the last analysis, depends the demand for iron and steel and the prosperity of the basic industries involved. By examining the component elements we can gain some idea as to the outlook for the near future. The *railroad industry*, for example, is doing splendidly and has shown a steady gain in freight traffic from May through July that has been greater than usual for the season. In the last month it is estimated that the tonnage handled by the railroads was about 20 per cent above normal.

While freight traffic in August probably did not increase so much over July as it usually does, it has continued large and car loadings have made a new record. The earnings statements of the carriers have been favorable, a fact that has been reflected in the stock market. It is to be remembered that our railroads have had many lean years and that their present earnings are on the whole barely satisfactory, but improvement has been real and with their better financial condition, improved buying is probable this autumn. In this connection we note that continued heavy orders for bridge material have been a large factor in sustaining the structural steel bookings.

### *Railroad Buying Will Balance Any Decline in Buildings*

AS to *building activity*, the steady decline in permits and new contracts through July has not yet had much effect on actual operations, but the moderate decline in orders for structural steel indicates what the inevitable outcome will be. Nevertheless, new contracts gained in August, actual building activity probably will continue large for some months, and there is a good chance that such declines as occurred will be offset by increased railroad buying.

*Automobile production*, which declined sharply between November, 1925, and April, 1926, has in recent months shown irregular stability and increased a little in July—allowance being made for the merely seasonal changes. The automobile manufacturers have been helped by a good export demand and by the excellent purchasing power of domestic consumers. The usual autumn expansion does not seem likely to reach the peak levels of last year, but promises to be sufficient to insure a good demand for sheets, strips, rods and other materials required.

July activity in *general manufacturing* (excluding iron and steel and automobiles) was little changed from June, in which month a good recovery from May was recorded. Machine tool orders, however, dropped off rather sharply in July, and August is reported to have been a rather disappointing month. There has

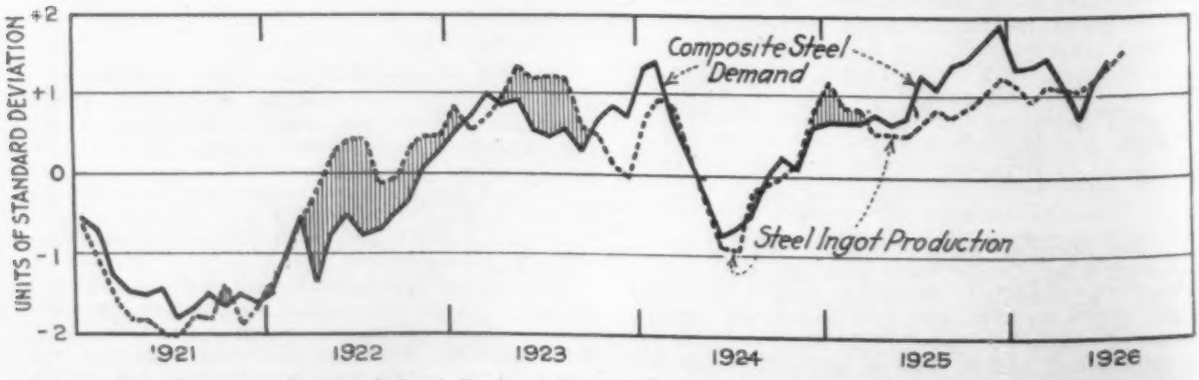


*Fig. 1—The Composite Curve of Steel Demand Has Come into a Satisfactory Relation to the Production Curve, with Signs of Remaining So for Some Months*

# In This Issue

*Foresees bright future for gray iron alloy castings.* — Electric furnace product is strong, tough, and wear-resisting. Suitable for such a wide range of uses that it will probably bring about a considerable change in the gray iron foundry industry.—Page 764.

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*Portable X-ray equipment may increase the use of this means of examining castings, welds, or metal.*—No longer any need to move the object to the X-ray machine. Operator can make fluoroscopic examination readily, eliminating expensive and time-taking radiography.—Page 783.

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*Is titanium a better final deoxidizer than aluminum in making steel castings?*—Not only produces higher ductility but a better elastic ratio, metallurgist asserts.—Page 787.

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*Tar-coated ingot molds used by Swedish steel makers.*—Lengthens the life of the mold and safeguards high carbon steel ingots from surface defects by providing a protective covering of gas around the steel while pouring.—Page 785.

---

*"Cold-sizing" drop forgings and some classes of castings shows marked economies over machining, says press manufacturer.*—Pieces can be "squeezed" to a tolerance of 0.001 in. at a production rate many times that of milling or grinding.—Page 789.

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*High wages in themselves do not make for prosperity.*—Faulty observations of superficial "economists" may delude Europe into believing that high wages are the royal road to quick prosperity. They are the *effect* of America's prosperity, not the *cause*.—Page 802.

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*Steel output established a new August record.*—Daily rate of 154,022 gross tons was more than 12 per cent above the previous August, 1920, record, and 13,597 tons per day above July.—Page 801.

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*The strike has reduced England's iron output almost to the vanishing point.*—August output was only 13,600 tons, as contrasted with the April pre-strike output of more than a half million tons.—Page 805.

---

*Pre-heating scrap increases steel foundry furnace capacity about 50 per cent.*—Scrap is loaded into a steel, brick-lined charging bucket; a 12-in. pipe is then withdrawn, and into the hole which is left an oil flame is directed. The bucket is hoisted directly to the furnace, and the scrap bottom-charged. —Page 760.

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*"Where is all the steel going?"*—The proportion of output going to the countless unclassified uses is steadily increasing. The steel industry will not be able to define its markets adequately until a plan for analyzing steel distribution is made effective.—Page 802.

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*Chicago steel foundry kills the bogey of dwindling skilled labor supply by conducting an apprenticeship course.* — Is successfully creating its own skilled labor. Students are paid wages, increasing semi-annually; molding course takes three years; pattern-making and tool-making, four years each. Apprentices are permitted to terminate contract at will.—Page 766.

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*Gray iron foundry increases accuracy of its quotations by establishing costs on different grades of molten metal.*—Instead of using a single average cost, three averages are calculated, based on the grade of pig iron and the relative proportions of scrap and pig iron in the melt.—Page 763.

---

*Life of steel foundry furnace lining greatly lengthened by avoiding removal of furnace top for charging.*—Electric furnace has a tilting roof, over which charging bucket is spotted and let down 2 in. into the furnace. Charging is done by tripping bottom of bucket. Thus air, which causes spalling, is not admitted.—Page 760.

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*Hand-to-mouth buying stabilizes production and employment for steel producers.*—Ample productive capacity has made forward buying unnecessary. This condition will prevail until increase in demand grows faster than new capacity.—Page 803.

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*Workmen's automobiles have aided industrial employers in solving the housing problem.* — One large manufacturer finds that nearly half of his employees ride to work in automobiles, which makes it unnecessary for the worker to live near the factory.—Page 804.

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*Steel Corporation's unfilled orders declined slightly.*—Aug. 31 total was 3,542,235 tons, less than 2 per cent or 60,187 tons below July 31 figures.—Page 800.

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## Welcome to Europe's Foundry Ambassadors

ON next Monday a party of nearly 100 foundrymen (see page 782), will arrive in the United States from Great Britain and the continent of Europe. They are coming to take part in the foundry congress at Detroit in the following week. They will be here but a short time, Sept. 21 to Oct. 13, but to make their sojourn as profitable as possible, they will be conducted on a somewhat intensive tour. The swing of the circle includes stays, unfortunately brief, in New York, Philadelphia and Buffalo on the way to Detroit, and in Chicago, Cleveland, Pittsburgh and Washington on the way back.

The visitors, we are sure, will find that their American confreres are waiting to welcome and banquet them, to exchange technical experiences with them, and to throw open their foundries to general inspection. THE IRON AGE joins with the American Foundrymen's Association, the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers and the Foundry Equipment Manufacturers' Association in acknowledging the honor done to the United States by the visit. We hope this issue will serve to signalize the event and prove of special value.

*For News Summary See Reverse Side*

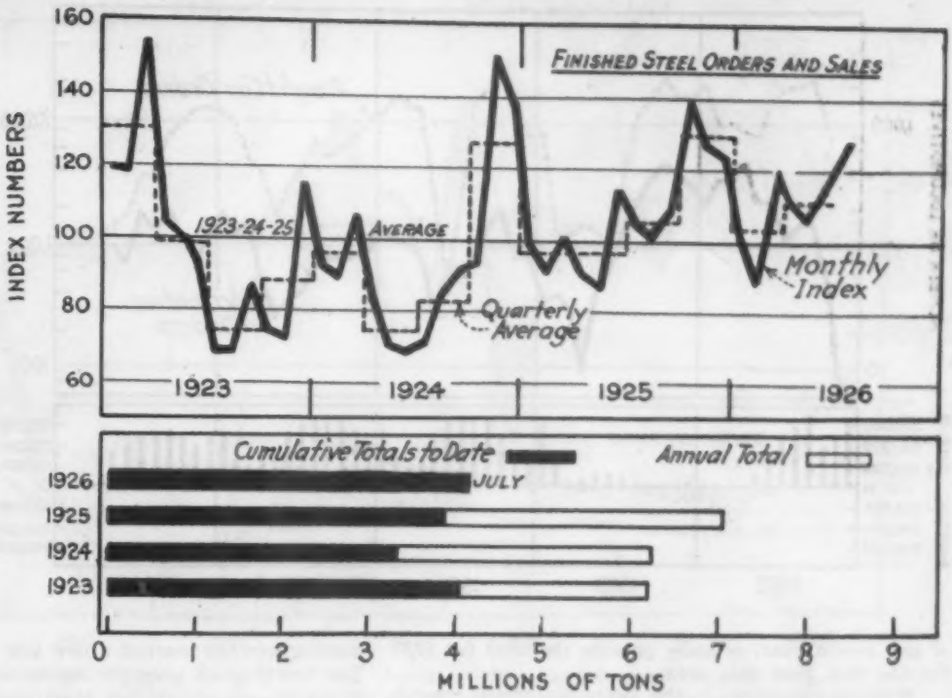



*Fig. 2—Finished Steel Orders and Sales Reached in July the Highest Point for That Month in Any Recent Year. Also, the cumulative total for the first seven months is larger than for the like period of any recent year*

been some real improvement in such backward industries as shoe manufacturing, textiles and sugar refining. On the whole the outlook is for a well sustained volume of manufacturing activity through the autumn months. Our indexes of activity in the *petroleum and mining* industries are tending upward and those industries should continue to contribute their full quota to the order books of the steel producers.

### *Farmer Purchasing Power Hardly Bettered*

*Agriculture* is in general to be characterized as only fairly satisfactory. The purchasing power of farmers, on the average, is probably little, if any, better than it was at the low levels reached a year ago. The quantity of farm products marketed has been large, but the prices received have declined both absolutely and in comparison with non-agricultural products. Nevertheless, the farm implement manufacturers are showing increased activity and the demand for their products is reported to be good, though it is possibly stimulated to an undesirable extent by credit extensions to the farmers.

A sharp gain in *exports* of iron and steel during July contributed appreciably to the advance in the composite demand line. We are frankly skeptical as to the continuation of this trend. Considerable progress has been made by European steel producers, notably in the case of Germany. The English coal strike cannot last forever. It is fairly clear that no long period can elapse before our steel producers will find increasing inroads on foreign markets being made by European competitors.

*The net conclusion is that there is at present a good adjustment between steel production and the potential demand for steel.* Buyers are not disposed to order ahead and may postpone from time to time their orders even for current requirements. But, with activity in the chief steel-using industries at present levels, current buying should continue to keep pace with production during the next few months.

### *Record Seven Months in Steel Sales*

THE course of our barometer of orders and sales for finished steel furnishes a striking confirmation of the significance of the composite demand line. As shown in the second chart, the trend of such orders and sales was upward in June and July. *In July the curve reached the highest point for that month in any recent year,* but the average for the second quarter exceeds any average for the same period during the last five years. The cumulative total for the first seven months of 1926 is larger than the first seven months

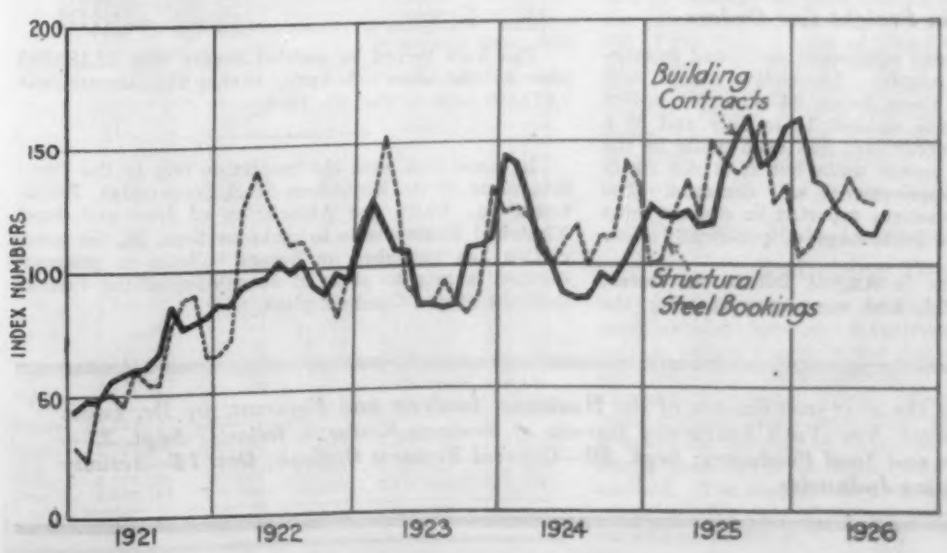



*Fig. 3—While Building Activity Is Large and, Measured in Terms of Floor Space, Increased in August, There Are Reasons to Believe the Long Time Trend Is Now Downward. The prevailing trend in fabricated structural steel is believed also to be downward*

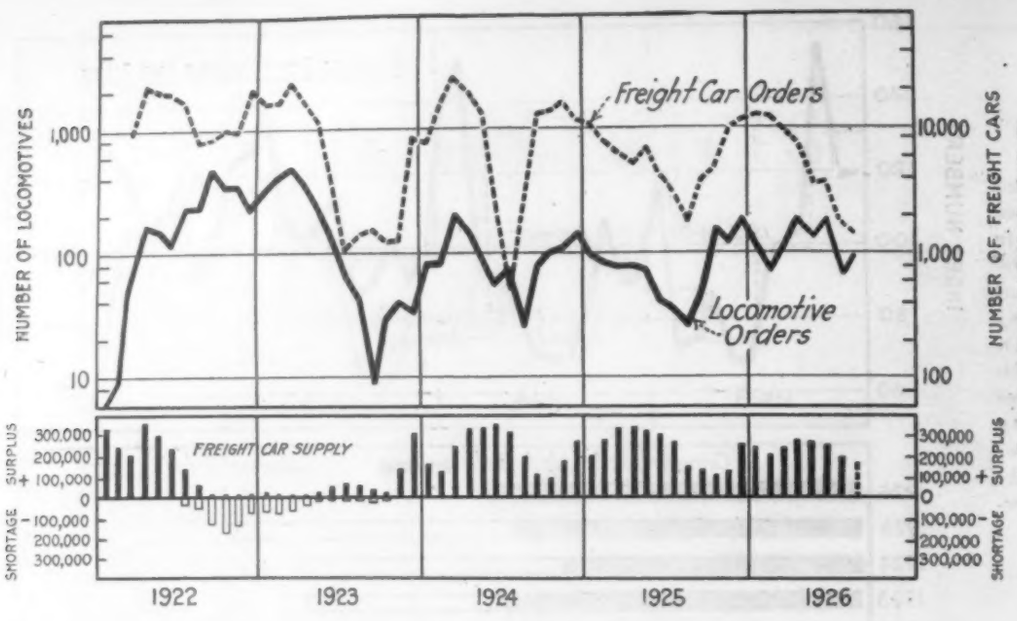



*Fig. 4—Freight Car Orders in August Fell to the Lowest Point Since July, 1924. Locomotive orders held up fairly well. Both curves are here plotted as a 3-month moving average*

of any recent year, actually passing the total for 1923 for the first time this year.

Without exception, in the years for which records are available, there have been sharp gains in the orders and sales of finished steel in the early winter months—either in October, November or December. While the industry may experience some setback in October or November, the outlook for the third quarter is very good and the usual year-end peak should be high.

Divergent trends are shown by the various kinds of finished steel, perhaps the most notable fact being that sheets and steel castings have gained, while both structural steel and fabricated steel plate orders have shown decreases. Present indications are that August figures when available will show a gain in the awards of fabricated structural steel, though the month's record will not be up to the spring peak.

### *Trend in Building Now Downward*

THE reasons for the decline in the foregoing lines of finished steel are to be found largely in the building data, as illustrated in the third chart. There is little to add, however, to statements made in this department in earlier issues of THE IRON AGE. While building activity is large and the figures covering square feet of floor space in new contracts increased in August, there are good reasons to believe that the long-time trend is now downward. As a result, the bookings of structural steel declined in June and July and, in spite of the probable gain in August, we think the prevailing trend is downward.

### *Low Point in Freight Car Orders*

DEMAND for railroad equipment continued unsatisfactory through August. Locomotive orders have held up fairly well, there being 84 domestic orders reported for that month against 14 in July and 26 a year ago. Rapid improvement has been made in the efficiency of railroad power units but it is not likely that the railroads' requirements will decrease. The large number of locomotives reported in storage must include a considerable percentage of practically obsolete units.

Freight car orders in August fell to the lowest point since July, 1924, and our curve showing the moving average reached a new low point for the year. The fourth chart gives the impression that the general trend of car orders has been irregularly downward since November, 1924. According to *Railway Age*, only 164 freight cars were ordered in August, against 1258 in July and 2816 in August, 1925.

It will soon be high time for the usual autumn and winter gains in equipment orders and, as indicated above, we consider it probable that some improvement will soon occur.

## Small Decline in Steel Corporation's Unfilled Orders

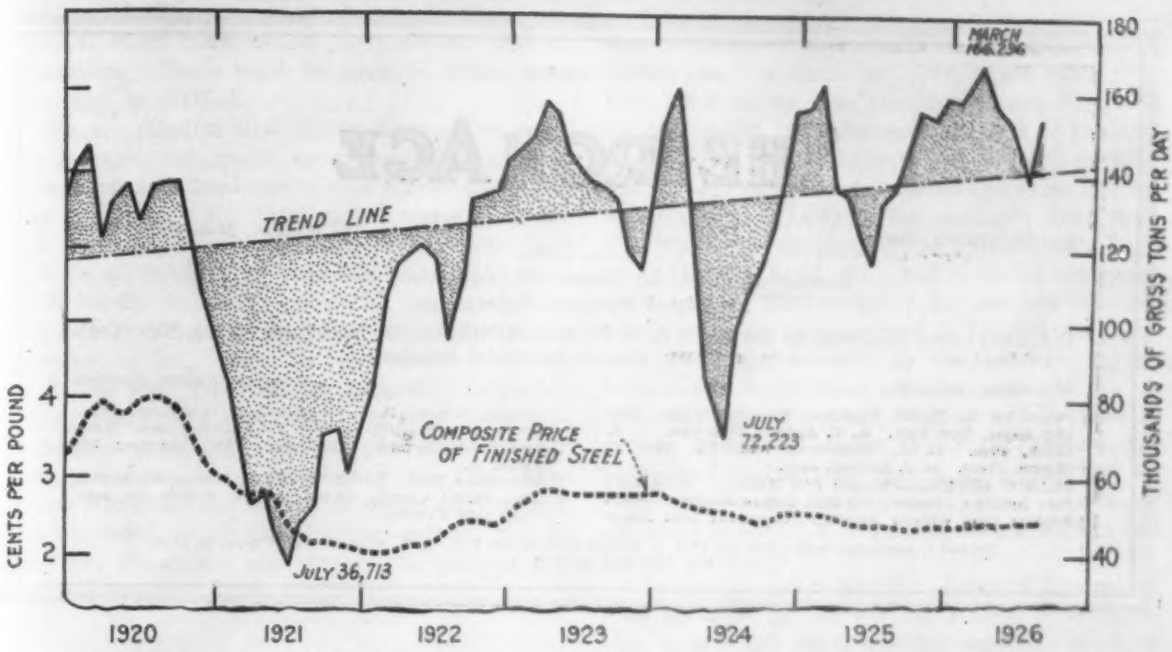
Unfilled orders of the United States Steel Corporation declined moderately in August. The total unfilled business on Aug. 31 amounted to 3,542,335 tons, a decrease of 60,187 tons from the 3,602,522 tons on July 31. This contrasts with an increase in July of 123,880 tons (the first increase since December, 1925). A year ago the unfilled business was 3,512,803 tons, or 29,532 tons less than at the end of August, this year. The following table gives the unfilled tonnage as reported by months beginning with January, 1924:

| | 1926 | 1925 | 1924 |
|---|---|---|---|
| Jan. 31 | 4,882,739 | 5,037,323 | 4,798,429 |
| Feb. 28 | 4,616,822 | 5,284,771 | 4,912,901 |
| March 31 | 4,379,935 | 4,863,564 | 4,782,807 |
| April 30 | 3,867,976 | 4,446,568 | 4,208,447 |
| May 31 | 3,649,250 | 4,049,800 | 3,628,089 |
| June 30 | 3,478,642 | 3,710,458 | 3,262,505 |
| July 31 | 3,602,522 | 3,539,467 | 3,187,072 |
| Aug. 31 | 3,542,335 | 3,512,803 | 3,289,577 |
| Sept. 30 | ..... | 3,717,297 | 3,473,780 |
| Oct. 31 | ..... | 4,109,183 | 3,525,270 |
| Nov. 30 | ..... | 4,581,780 | 4,031,969 |
| Dec. 31 | ..... | 5,033,364 | 4,816,676 |

The high record in unfilled orders was 12,183,093 tons at the close of April, 1917. The lowest was 2,674,757 tons on Dec. 31, 1910.

In connection with the inspection trip to the Cambria plant of the Bethlehem Steel Corporation, Johnstown, Pa., which the Association of Iron and Steel Electrical Engineers is to make on Sept. 25, the association has published an 8-page bulletin or program devoted largely to pictorial description of the various portions of the Cambria plant.

*Schedule of the next installments of the* **Business Analysis and Forecast**, *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* **Sept. 23**—*Position of Iron and Steel Producers;* **Sept. 30**—*General Business Outlook;* **Oct. 14**—*Activity in Steel Consuming Industries.*




*Daily Production of Steel Ingots in August Was About 9.7 Per Cent Larger Than in July. If production in each of the remaining four months were no greater than that for July, 1925, the year 1926 would still be a record*

# Large Gain in August Steel Ingot Output

## Daily Rate 9.7 Per Cent Larger Than July—Exceeds Any August on Record—Eight Months 3,000,000 Tons Ahead of Same Period Last Year

A SHARP increase was registered in the August production of steel ingots, and the largest August output on record was reached. At 154,022 gross tons per day for the 26 working days, the production last month was 13,597 tons larger than the July rate, or an increase of 9.7 per cent. The next largest August production was 137,016 tons per day in 1920, so that the output last month was nearly 12½ per cent larger than the best August record.

The statistics of the American Iron and Steel Institute show that the August production for the companies which made 94.50 per cent of the country's total in 1925 was 3,784,331 tons. Assuming that the 5.50 per cent not reporting produced at the same rate, a total August output is indicated of 4,004,583 tons, from which the daily rate was calculated. According to the estimates of the institute, August operations were 85.78 per cent of the "theoretical" capacity, compared with 78.20 per cent in July, 80.34 per cent in June, 84.51 per cent in May, 88.33 per cent in April and 92.58 per cent in March, the peak of the year.

The table gives the reported production by months of the different kinds of steel, together with the estimated daily rate for all companies.

**Production of Steel Ingots**
(Gross Tons)

| Months | Reported by Companies Which Made 94.50 Per Cent of the Steel Ingot Production in 1925 | | | Calculated Monthly Production | Approximate Daily Production |
|---|---|---|---|---|---|
| 1926 | Open-Hearth | Bessemer | All Other | All Companies | All Companies |
| Jan. | 3,326,846 | 581,683 | 13,664 | 4,150,469 | 159,633 |
| Feb. | 3,023,829 | 556,031 | 12,818 | 3,801,776 | 158,407 |
| March | 3,590,791 | 635,680 | 15,031 | 4,488,362 | 166,236 |
| April | 3,282,435 | 601,037 | 13,652 | 4,123,941 | 158,613 |
| May | 3,201,230 | 516,676 | 10,437 | 3,945,336 | 151,744 |
| June | 3,036,162 | 498,764 | 9,441 | 3,750,653 | 144,256 |
| July | 2,911,375 | 526,500 | 12,372 | 3,651,055 | 140,425 |
| Aug. | 3,145,055 | 627,273 | 12,003 | 4,004,583 | 154,022 |
| 8 mos. | 25,517,723 | 4,543,644 | 99,418 | 31,916,175 | 154,184 |
| 1925 | | | | | |
| Jan. | 3,263,256 | 689,996 | 11,960 | 4,193,281 | 155,307 |
| Feb. | 2,933,225 | 602,042 | 12,998 | 3,752,352 | 156,348 |
| March | 3,337,721 | 614,860 | 13,633 | 4,194,340 | 161,321 |
| April | 2,858,866 | 515,715 | 14,182 | 3,583,676 | 137,834 |
| May | 2,755,561 | 497,708 | 13,790 | 3,454,971 | 132,883 |
| June | 2,540,729 | 476,945 | 12,490 | 3,204,451 | 123,248 |
| July | 2,446,068 | 457,095 | 13,547 | 3,084,472 | 118,634 |
| Aug. | 2,698,285 | 523,734 | 12,914 | 3,430,993 | 131,577 |
| 8 mos. | 22,833,711 | 4,378,095 | 105,514 | 28,893,541 | 139,553 |
| Sept. | 2,738,678 | 547,121 | 13,977 | 3,489,565 | 134,214 |
| Oct. | 3,077,114 | 584,667 | 15,624 | 3,888,814 | 144,030 |
| Nov. | 3,092,194 | 681,347 | 17,085 | 3,902,909 | 156,116 |
| Dec. | 3,169,796 | 569,304 | 15,843 | 3,970,918 | 152,728 |
| Total | 34,911,493 | 6,660,434 | 168,043 | 44,140,738 | 141,932 |

## Additional Exhibits at Track Supply Convention

The following manufacturers will exhibit at the 44th annual convention of the Track Supply Association in Chicago on Sept. 21, 22 and 23, in addition to the companies whose names were mentioned on page 606 of the Sept. 2 issue of THE IRON AGE: Hayes Track Appliance Co., Morden Frog & Crossing Works, National Malleable & Steel Castings Co., Pettibone Mulliken Co., Racine Tool & Machine Co., Railroad Accessories Co., St. Louis Frog & Switch Co., William Wharton, Jr., & Co., Wyoming Shovel Works.

## Propose Rate Increases in Chicago Switching District

Substantial increases in freight rates on iron and steel articles between industries with individual or private switch tracks in the Chicago switching district are provided for in Supplement 9 to the Illinois Freight-Chicago Switching Tariff, effective Oct. 10. The present rates range from 2½c. to 3c. per 100 lb., with a minimum carload of 60,000 lb. The proposed rates range from 5½c. to 6½c., with the same minimum carload. The supplement provides for an alternate application of a rate of 8c. per 100 lb., with a minimum carload of 36,000 lb.

ESTABLISHED 1855

# THE IRON AGE

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## Widespread Steel Demand

IF one really familiar, as such things go, with the flow of orders in steel were asked to compare this year with last and estimate the increases or decreases that have occurred in the steel requirements of the various known lines of consumption it is quite improbable that his summary would harmonize with the production of steel as actually reported. The ingot production statistics for eight months are as follows:

| | Gross Tons. |
|---|---|
| 1925 | 28,888,541 |
| 1926 | 31,916,175 |
| Increase, tons | 3,027,634 |
| Increase, per cent | 10.5 |

The time was when orders for rails, freight cars, fabricated structural steel, agricultural implements and perhaps a few other lines constituted the great indexes to steel demand. They were regarded as quite sufficient, and it was the common view that the steel industry could not be fully active except by virtually unanimous consent—that every important line had to make a liberal contribution.

This year there has not been such universal support. Some lines have gone back, leaving the other lines to make up the deficit by contributing more than the 10.5 per cent increase shown by the total.

While the increase in exports, according to figures for seven months, was large in proportion, 25 per cent, the steel ingot increase thus accounted for was only about a quarter million tons, and that would merely decrease the 10.5 per cent gain to a 10 per cent gain for domestic steel.

Freight car installations in the first seven months of this year are reported at 66,258 cars, against 93,869 cars in the same period of last year, a 29 per cent decrease. Neither of these totals is large, incidentally, compared with some of the pre-war activity.

Fabricated structural steel work has made no appreciable contribution to this year's increase in steel generally.

Passing to classes of manufacture, the wire trade has made no noticeable gain this year, and may have had a loss. Tin plate production, it is known, has been heavier than it was last year, when the previous record was broken by 10 per cent, but only a fraction of the additional 3,000,000 tons of ingots can be so assigned.

Thus a great deal of the 1926 increase in steel is left to be made up by the "all other," and few items indeed can be picked out with confidence. The total of all such showings would quite fail to cover the tonnage for which we are trying to account. A conspicuous item, of course, is oil country tubular goods, which have been doing remarkably well.

On the whole, the point in the argument is that closer study of lines of outlet for steel is dictated. It does not suffice simply to put in the "miscellaneous" class lines not hitherto considered separately. Some of them are rising out of that class. It is evident that some such plan for analyzing steel distribution as was put before the American Iron and Steel Institute three years ago must be adopted before the industry can give adequate answer to the question asked with increasing frequency of late, "Where is all the steel going?"

## The Gospel of High Wages

THE so-called gospel of high wages that is being preached for the benefit of Europe may be received mistakenly and may be discovered to be not a gospel at all. In other words, high wages are not a cause but are an effect. Some persons whose minds are not quite clear seem to interpret this upside down.

Thus, the British Ambassador to the United States recently remarked in a formal address: "You in the United States have learned the gospel of high wages, and you have applied it and shown the world that it works."

Of course, what works economically in one country ought to do so in another. Suppose, then, that tomorrow Great Britain should raise wages all around to the American level. Would any one imagine that this would immediately reproduce American prosperity?

The consuming power of the British public would be multiplied, to be sure, but out of what

fund would the increase in wages come? Manifestly it could come out of no fund but that of production. There must be produce before anything can be divided.

We are mindful that Henry Ford a few years ago startled the world by reversing this. The normal course is for labor to earn higher wages and then get them. Mr. Ford raised wages first and then drove his men to earn them. While that may be done successfully by an individual management it is hardly to be recommended for trial as a national expedient. We can not conceive the British economy, or any other, so readjusted.

Either way, however, the leadership falls upon management. Its obligation is to show labor how to produce more and then let it participate through higher wages. Labor alone does not know how. Henry Ford did not merely drive his men to earn the enhanced wages that he proposed but also he provided the means and showed the workers how to use them.

## Hand-to-Mouth vs. Seasonal Buying

IN a well-thought article in the *Saturday Evening Post* President E. G. Grace of Bethlehem discusses short-term buying in the light of the great change it has brought about in the steel industry. Mr. Grace goes more deeply into the subject than most of the comment that has appeared in financial and industrial reviews in the past year. Commonly such reviews have coupled hand-to-mouth buying with the remarkable performance of the railroads which in the steel industry has cut the time of transit between mill and consumer's plant to a fraction of what it had long been. They have pointed out that inventories are greatly reduced, now that railroad cars are made to do warehouse duty, and thus the consumer's interest bill for borrowed capital can be cut materially. They have generally taken it for granted also, that the manufacturer does not like the new regime, since it gives him little basis for planning his operations ahead, and that he would welcome an old-fashioned forward buying movement accompanied by advancing prices.

Mr. Grace, however, writes of the new buying policy as highly desirable from the standpoint of the producer, and his analysis of its operation in the steel industry indicates his hope that the old alternation of full order books and empty mills has gone and will not return. His citations from the experience of the Bethlehem Steel Corporation strikingly reinforce his argument. Under the old system of seasonal orders, he writes, "we considered not abnormal a year in which the fluctuation of employment ran from a peak of 80,000 men during capacity operation down to 30,000. . . . Instead of considering the effect on general prosperity of throwing 50,000 men out of work, we congratulated ourselves on being able to keep 30,000 in the mills." The records of the past two years of hand-to-mouth buying are in marked contrast. "In 1924 our peak was 67,500 men, and the minimum employment 47,000. That, in my opinion, is as near as we shall get for some years to the old seasonal fluctuation. In 1925 we reached a top of 66,500, falling off only to 59,000."

Illustrating the release of capital under the present regime—"the transfer of millions from idle shelves to active factories"—Mr. Grace adds: "In 1923, after taking over the Lackawanna Steel Co., our corporation had a material account of $90,000,000. By the end of 1925 it was reduced to $69,000,000. In other words, we did the same amount of business on $21,000,000 less capital." Even more striking is the showing of the Pennsylvania Railroad, which in April, 1921, had in its material-and-store account $120,000,000. By the end of 1925 this account had been reduced to $50,000,000 "by a shift from the seasonal to the monthly buying basis and by a system of inventory control."

"Distributed Prosperity," the title of Mr. Grace's article, quite well epitomizes his argument for short-time buying. He sees it as a stabilizer of production and employment, a force constantly operating in behalf of large payrolls and maintained buying power.

To the question whether forward buying of steel has gone by and will not return, it would be rash to give any but a qualified answer. Much of the hand-to-mouth buying of the past two years in all lines has been due no doubt to a belief, widely held, that the general trend of prices, in view of the country's excess capacity and under post-war readjustments, would be downward, and that advances would be exceptional and temporary. At no time since the early months of 1923 has the consumer of steel had reason to resort to forward buying to make sure of having a full supply as he needed it.

Such a time may come again if producers, under moderate or less than moderate profits, refrain from building new capacity and in something like the old-time way the country wakes up to find existing plant unequal to the demand upon it. But leaving out the extraordinary—like the combination of coal and railroad strikes in 1922—a repetition of the well-remembered upswings in bookings and in prices is not likely to come soon. Certain features of the present regime, as Mr. Grace's article well shows, have been favorable to producers as well as consumers, chief among these being its stabilizing influence on both production and prices. But at every stage of the new regime the buyer has been an opportunist, consulting his interest at the moment, rather than deliberately helping to usher in a better day for industry.

## Workmen's Automobiles

HOW large a place the automobile has taken in the daily transportation of industrial employees appears from a survey made by the employment department of the Norton Co. at its Worcester, Mass., plant. The purpose was to assist in planning for the parking of cars. It was brought out that nearly one-half of the 2900 persons connected with the plant ride regularly to and from their work in automobiles. The total number of cars owned is 740, of which 419 are driven to work daily, carrying on the average three employees.

A study of workmen's automobiles seems to prove that they do not represent the extravagance commonly alleged. Of course a certain proportion of the men buy beyond their means. But most of

the cars are of low-priced makes, and very many of these are bought second-hand at small figures. Their owners do most of the work of maintenance. A considerable per cent of these people live at a distance from their work which otherwise would be impossible. In an increasingly large proportion they are in suburban neighborhoods. Not a few of them have literally carved a home out of the wilderness of brushlots. They have their home gardens. Their rent charges and other living expenses are relatively small when compared with the city. Where the car owner transports regularly several of his fellow workmen who are his home neighbors, they sharing the cost, the transportation item is made light.

Similarly the influence of workman ownership of motor cars is felt by manufacturers whose plants are in the suburbs of cities or in the towns. The problem of ample housing for their help is made much less serious. To drive a dozen miles morning and night is no more of a strain than to patronize a trolley line within the city, and often the time consumed is less. When men make their homes in good country air there must be a favorable reaction upon their health and therefore on their labor. That employers realize these things is made evident by their efforts to provide suitable and safe parking places for the fleet of workmen's cars.

## Steel Production and Capacity

LAST January a report was issued on steel ingot making capacity by a special committee of the American Iron and Steel Institute. At that time the committee announced that a statement as to capacity in steel castings could not be made as there had been insufficient replies. In the recently issued annual statistical report the findings of the committee as to steel castings capacity are published for the first time.

It is of interest to compare actual steel production last year with capacity. The steel ingot production, which was the largest recorded for a calendar year, was 79 per cent of the capacity as determined by the committee. The production of steel castings, which was 13 per cent under the record made in 1917, was 63.6 per cent of ascertained capacity.

The ingot production of 79 per cent is figured against 55,844,033 tons, which is called "theoretical capacity." The committee took 50,000,000 tons as "practical capacity," this being "a production that may be attained in a year of maximum demand." On that basis last year's ingot production was 88.3 per cent.

A comparison by processes shows that there were large divergences last year, the fullest ingot production proportionate to capacity being attained by the basic open-hearth furnaces. The following tables show the capacities as reported by the committee and the percentage relation of last year's production to the respective capacities:

| | Capacity, Gross Tons | Production, 1925, Per Cent |
|---|---|---|
| *Steel Ingots* | | |
| Basic open-hearth | 45,504,295 | 80.5 |
| Acid open-hearth | 858,750 | 56.5 |
| Bessemer | 8,693,800 | 76.7 |
| Crucible | 81,086 | 21.9 |
| Electric | 706,102 | 47.6 |
| Total | 55,844,033 | 79.0 |
| *Steel Castings* | | |
| Basic open-hearth | 737,246 | 61.8 |
| Acid open-hearth | 730,629 | 63.3 |
| Bessemer | 75,534 | 71.2 |
| Crucible | 2,647 | 69.3 |
| Electric | 422,442 | 66.2 |
| Total | 1,968,498 | 63.6 |

The low percentage of electric steel ingots made suggests that this industry, naturally regarded as a growing one, still has much to do in making a market for itself. The low percentages in acid open-hearth and in crucible merely confirm tendencies indicated by the statistics of other years.

The low rate of operation in the case of steel castings is not particularly unfavorable. It will be recognized that in many cases such capacity is carried by large machinery makers as a sort of adjunct, to be used as the nature of orders being filled requires.

ANTHRACITE mining has another reminder of the user's determination to get along without hard coal. In New Haven demand for coke for household purposes has been so great since the anthracite strike that a coke oven builder sees an opportunity to erect coke ovens there and is actively negotiating to buy the local gas company to dispose of the gas by-product. Meanwhile the gas company itself has made strides in promoting the use of gas as a house-heating fuel. Thus soft coal by being split into two forms is being popularized in a region where hard coal substitutes were thought to be merely temporary makeshifts. There is of course a lesson in this, but it comes to an industry that has been all too slow to appreciate the public's patience and its own vulnerability.

## Departure in Tin Mill Design for Gary Plant

The American Sheet & Tin Plate Co. will shortly begin placing the machinery and equipment for an addition to its tin plate mills at Gary, Ind., which will permit an enlargement of the output of that plant by approximately 50 per cent. The new unit calls for an expenditure of between $8,000,000 and $9,000,000 and the appropriation has been authorized by the finance committee of the United States Steel Corporation, of which the company is a subsidiary. The present plant comprises 24 double hot black plate mills with the sheet and pair furnace equipment for 48 single hot mills. The new mill, it is officially stated, will bring about the increased production by obviating the primary reduction of the sheet bars now done on the hot mills. There is the inference that the company will install a continuous mill for the reduction of the bars, say to No. 19 gage, and the present mills, relieved of that part of the operation, will be able to turn out increased tonnages of the commercial gages.

The Associated Machine Tool Dealers will hold an executive meeting, Sept. 20 to 24 at the Pearson Hotel, 190 East Pearson Street, Chicago. Tyler Carlisle of Strong, Carlisle & Hammond Co., Cleveland, is secretary.

## American and European Foundry Conditions Compared

Various personal experiences as well as new foundry and steel mill developments in Norway, Sweden, Germany, France and other European countries were described in considerable detail by Dr. Richard Moldenke on Wednesday evening, Sept. 8, at a meeting of the New England Foundrymen's Association at the Exchange Club, Boston. Dr. Moldenke recently returned from Europe and it was of this trip that his talk dealt. Touching on the gray iron industry, he said he had not lost his belief that it was coming back in this country.

In making comparisons, he said that raw materials in this country were comparatively low in cost while the cost of labor was high. Abroad, labor is cheap and raw materials expensive. To overcome the handicap of high material costs, Europeans are making their gray iron castings thinner and at the same time are making their irons stronger. We, he said, must learn to make thinner and better castings, and should take every opportunity to cultivate foreign markets.

Speaking of labor costs, he stated that the actual cost abroad in certain countries is greater than generally realized. For instance, in Germany the average wage paid in outlying districts is $1.50 per day, while in Berlin $6 prevails. The government, however, demands that manufacturers carry all kinds of insurance, and it has been necessary for the producer to hire a great deal of clerical help in connection with this insurance. Consequently, the overhead is materially increased at each plant.

In France, Dr. Moldenke witnessed women operating overhead traveling cranes in large steel works, while in Germany, women are engaged on molding machines. In both cases the women are war widows. In Sweden he saw foundries with molding machines from America, England, Germany and other countries. They had taken something from one country and added it to another, getting best possible results. He said that in this country we have few if any perfect foundries, owing to our system of putting in charge men who have risen from the ranks and are efficient in perhaps only one department. We should make a study of the best in all foundries and combine it under one roof.

H. P. Blumenauer, Arcade Malleable Iron Co., Worcester, Mass., president of the association, was chosen representative of the New England body at a reception to foreign visitors to the Detroit convention, to be held in New York on Monday, Sept. 20. The New Haven Sandblast Co., New Haven, Conn., was elected a member of the association. Mr. Blumenauer introduced A. B. Root, Jr., president American Foundrymen's Association, who, in turn introduced Dr. Moldenke.

## Heim and Cincinnati Grinders to Be Made by New Company

A consolidation of the Heim Grinder Co., Danbury, Conn., and the grinding machine department of the Cincinnati Milling Machine Co., Cincinnati, became effective Sept. 10, when articles of incorporation were filed at Columbus, Ohio, for a new company to be known as Cincinnati Grinders, Inc., with authorized capital stock of $1,500,000. P. O. Geier is president of the new company; George W. Binns is secretary and F. M. Angevin is treasurer. R. E. W. Harrison, formerly grinding machine engineer of the Churchill Machine Tool Co., Manchester, England, is a director of the company, as is Clement Booth, formerly works manager of the Heim Grinder Co. and previously engineer with the Heald Machine Co., Worcester, Mass. Other directors are W. Peaslee and P. H. Cone.

The former plant of the Triumph Electric Co. at Oakley, Cincinnati, has been acquired and the property will be converted immediately into a modern plant. It will be in operation early in 1927 with a force of several hundred men.

The Cincinnati Milling Machine Co. has been engaged in the manufacture of grinding machines for five years and has developed a line of plain, universal and centerless machines, while the Heim Grinder Co. has become well known as the maker of the Heim centerless grinder. The Heim Grinder Co. recently announced a new hydraulically-operated machine.

## Mechanical Engineers Plan Session for Steel Treaters' Meeting

Four papers will be presented at a session to be held under the auspices of the American Society of Mechanical Engineers in connection with the annual meeting of the American Society for Steel Treating. The session will be at the Drake Hotel, Chicago, on the afternoon of Sept. 23.

The papers are as follows: "The Possibilities of Standardizing Design Details in Plants Manufacturing Special Machinery," by H. K. Keever, McDonald Machine Co., Chicago; 'Inspection Methods," by E. D. Hall, Western Electric Co., Chicago; "Drop-Forge Hammer Anvils," by E. C. Clark, Chambersburg Engineering Co., Chambersburg, Pa.; and "Foremanship Training," Hugo Diemer, director of industrial development, La Salle Extension Institute, Chicago.

## Increased Foundry Iron Demand Expected in Birmingham

BIRMINGHAM, Sept. 14.—The Woodward Iron Co., has blown out its No. 3 furnace for repairing, and announcement is made that the output of another furnace of this company has been sold to a local steel company for some time, leaving three furnaces on foundry iron for the open market. An official of the Woodward company expressed the opinion that within 30 days demand for foundry iron will be so strong that every furnace in the Birmingham district capable of operating will be required. Thirteen blast furnaces are on foundry iron in this district, eight on basic and one on ferro-manganese.

## Youngstown Sheet & Tube Co. Starts New Plants

The tinning department at the Indiana Harbor, Ind., works of the Youngstown Sheet & Tube Co., Youngstown, started initial operations this week. The company is operating 12 of 24 tin mills in this group and expects to have the balance in operation by the end of this month. The tin house is equipped with automatic tinning machines.

One of the new seamless tube mills at the company's Campbell plant is in operation. It is the mill built in Germany, consisting of a piercing mill and two finishing machines capable of rolling seamless tubes from 6 to 13 in. in diameter. The American mill, capable of rolling tubes up to 8 in. in diameter, is known as an automatic mill and will be ready by Oct. 1.

"Steel business is better than I expected," said President James A. Campbell of the company. "We find that the new base price of 3c. per lb. for 24 gage common black sheets is being adhered to by everybody."

## Small British Steel Production

LONDON, ENGLAND (*By Cable*), Sept. 14.—August production of pig iron was only 13,600 gross tons and steel production 52,100 tons.

This shows the continuing effect of the grip of the coal strike upon the steel industry in Great Britain. Corresponding figures for July showed a pig iron production of 17,900 tons and steel of 32,100 tons. In June, 41,800 tons of pig iron was made and 32,800 tons of steel and in May the pig iron output was 88,800 tons, while steel was 45,700 tons. These compare with April figures—before the strike began—of 539,100 tons of pig iron and 661,000 of steel. Present conditions are similar to those in 1921, when steel production fell off from 359,000 tons in March to 3000 tons in June, while at the end of June there were no blast furnaces in operation.

# Iron and Steel Markets

## Steel Industry on an Even Keel

### Falling Off in Structural Lines May Be Offset by Railroad Demand—Water Transport Develops New Competitions—1926 Steel Output Gains 10 Per Cent on 1925

STEEL producers will be well satisfied to have September continue the July-August average in new business and in rate of mill shipments to consumers. That is substantially what the first half of the month has done, though in no line has there been any significant change, seasonal or otherwise.

Due to the adoption of a new base and price scale in sheets, that product has been more active than others, but until this week at old prices, thus repeating what happened in steel bars in late June. On the other hand there has been evidence this month of subsidence of demand for building steel.

Steel ingot production last month at the highest August rate on record, or at nearly 86 per cent of capacity, brings the eight months total for this year to 31,916,000 tons or 10½ per cent beyond that of 1925 to Aug. 31.

With last month's shipments so large, the decline of 60,000 tons in the Steel Corporation's unfilled orders was in keeping. If some lines show a falling off this month, there will be offsets in rail orders for 1927 and in sheet bar business for the fourth quarter that will go on the books just before Oct. 1.

With a slight increase at Youngstown, ingot production both for the Steel Corporation and the independents, is still running somewhat above 85 per cent.

Some fourth quarter contracts have been closed for bars, plates and structural shapes, but with these products stabilized as at present, no pronounced activity is looked for this month.

Nearly all Michigan automobile plants are holding their recent high rate of production, and expect to maintain it in October. Farm machinery plants are planning for larger fall operations.

Chicago mills have 65,000 tons of rail inquiries before them, and there are also pending 18,000 tons for the Texas & Pacific and 12,000 tons for the Gulf Coast Lines. Prospects are regarded as good for the closing of some large tonnages, East and West, in the next six weeks, but uncertainty still hangs over the car situation.

Water transport is cutting a larger figure lately in both the pig iron and finished material markets, with some disturbance of ordinary trade channels. The expected shipment of pig iron from a new Massachusetts furnace to Philadelphia and the making of a low water rate to permit Buffalo iron to enter the Philadelphia district are two developments of the past week.

Increasing use of the Lakes for the movement of rolled steel, particularly into the Detroit district, accounts for some recent deviations from the usual reckonings of mill prices. Sharp competition also in southwestern districts tributary to Gulf ports has resulted from low water rates.

Present tin plate orders will keep mills well occupied until early 1927 requirements are specified, operations with all the larger companies being still above 90 per cent. Pipe activity, long coupled with that in tin plate as outstanding, is still promising. A late order of the National Tube Co. is 200 miles of 8-in. line pipe for the Prairie Pipe Line Co.

With the falling off in structural steel awards since the first of the month, the week's total was 29,000 tons, including 5000 tons for a power plant and highway bridge at Conowingo, Md. Two New York buildings will take 3500 tons of reinforcing bars and piers at San Francisco may require 1500 to 2000 tons.

The scrap market at Pittsburgh has weakened, as both consumer and dealer demand has subsided, and on steel works grades the decline is 50 cents.

On sales of billets in eastern Pennsylvania, amounting to a few thousand tons, prices have been shaded to $34.50, Pittsburgh, a drop of 50c. a ton.

At Birmingham the market on cast iron pipe has declined $1 a ton to $39, and the low bid on 6500 tons at Detroit is $45.95, delivered, or the equivalent of $38.03, Birmingham.

Some Philadelphia steel warehouses have found it necessary to stock foreign bars and shapes to compete with those making a specialty of the foreign material. On foreign shapes 2.60c. is being quoted at Philadelphia, $3 to $6 a ton below what has been ruling on domestic steel.

Berlin advices that Treasury Department commissioners have found evidence of the dumping of German steel products in this country point to a like investigation of imports from France and Belgium. Reports in the same connection of further considerable purchases of German rails for New England are not confirmed.

To what extent Great Britain has had to turn to Continental semi-finished steel is shown in her production and exports. Against a total output of 162,700 tons of steel ingots for all of the four strike months, August exports alone amounted to 151,122 tons of finished steel. Steel production in April, the last pre-strike month, was 661,000 tons. Orders have backed up until some British mills have six months bookings.

Straits tin sold on Monday at 69.25c., New York, the highest price this year and exceeded since the war only in the spring of 1919 when the Government fixed the price at 72.50c. Heavy consumption and a shortage in supplies are major causes.

THE IRON AGE composite prices remain unchanged. Finished steel is 2.439c. per lb. and pig iron, $19.46 per gross ton.

# A Comparison of Prices

**Advances Over the Previous Week in Heavy Type, Declines in Italics**
**At Date, One Week, One Month, and One Year Previous**

## For Early Delivery

| Pig Iron, Per Gross Ton: | Sept. 14, 1926 | Sept. 7, 1926 | Aug. 17, 1926 | Sept. 15, 1925 |
|---|---|---|---|---|
| No. 2 fdy. Philadelphia | $21.76 | $21.76 | $21.76 | $21.26 |
| No. 2, Valley Furnace | 17.50 | 17.50 | 17.50 | 19.00 |
| No. 2, Southern, Cin'ti | 24.19 | 24.19 | 24.19 | 23.05 |
| No. 2, Birmingham | 21.00 | 21.00 | 21.00 | 18.50 |
| No. 2 foundry, Chicago* | 21.00 | 21.00 | 21.00 | 21.00 |
| Basic, del'd, eastern Pa | 20.75 | 20.75 | 21.00 | 20.50 |
| Basic, Valley furnace | 17.50 | 17.50 | 17.50 | 18.50 |
| Valley Bessemer del. P'gh | 19.76 | 19.76 | 19.76 | 21.26 |
| Malleable, Chicago* | 21.00 | 21.00 | 21.00 | 21.00 |
| Malleable, Valley | 17.50 | 17.50 | 17.50 | 19.00 |
| Gray forge, Pittsburgh | 18.76 | 18.76 | 18.76 | 20.26 |
| L. S. charcoal, Chicago | 29.04 | 29.04 | 29.04 | 29.04 |
| Ferromanganese, furnace | 88.00 | 88.00 | 88.00 | 115.00 |
| **Rails, Billets, etc.,** Per Gross Ton: | | | | |
| O.-h. rails, heavy, at mill | $43.00 | $43.00 | $43.00 | $43.00 |
| Light rails at mill | 33.00 | 33.00 | 34.00 | 36.96 |
| Bess. billets, Pittsburgh | 35.00 | 35.00 | 35.00 | 35.00 |
| O.-h. billets, Pittsburgh | 35.00 | 35.00 | 35.00 | 35.00 |
| O.-h. sheet bars, P'gh | 36.00 | 36.00 | 36.00 | 35.00 |
| Forging billets, base, P'gh | 40.00 | 40.00 | 40.00 | 40.00 |
| O.-h. billets, Phila | 40.30 | 40.30 | 40.30 | 40.30 |
| Wire rods, Pittsburgh | 45.00 | 45.00 | 45.00 | 45.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, gr. steel, P'gh, lb. | 1.90 | 1.90 | 1.90 | 1.90 |
| **Finished Iron and Steel,** | | | | |
| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
| Iron bars, Philadelphia | 2.22 | 2.22 | 2.22 | 2.12 |
| Iron bars, Chicago | 2.00 | 2.00 | 2.00 | 1.90 |
| Steel bars, Pittsburgh | 2.00 | 2.00 | 2.00 | 1.90 |
| Steel bars, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Steel bars, New York | 2.34 | 2.34 | 2.34 | 2.24 |
| Tank plates, Pittsburgh | 1.90 | 1.90 | 1.90 | 1.80 |
| Tank plates, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Tank plates, New York | 2.24 | 2.24 | 2.24 | 2.09 |
| Beams, Pittsburgh | 2.00 | 2.00 | 2.00 | 1.90 |
| Beams, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Beams, New York | 2.34 | 2.34 | 2.34 | 2.24 |
| Steel hoops, Pittsburgh | 2.50 | 2.50 | 2.50 | 2.40 |

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

| Sheets, Nails and Wire, | Sept. 14, 1926 | Sept. 7, 1926 | Aug. 17, 1926 | Sept. 15, 1925 |
|---|---|---|---|---|
| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
| Sheets, black, No. 24, P'gh | 3.00 | 3.00 | 2.95 | 3.00 |
| Sheets, black, No. 24, Chicago dist. mill | 3.10 | 3.10 | 3.10 | 3.15 |
| Sheets, galv., No. 24, P'gh | 3.85 | 3.85 | 3.80 | 3.75 |
| Sheets, galv., No. 24, Chicago dist. mill | 3.95 | 3.95 | 3.95 | 3.90 |
| Sheets, blue, 9 & 10, P'gh | 2.30 | 2.30 | 2.30 | 2.25 |
| Sheets, blue, 9 & 10, Chicago dist. mill | 2.40 | 2.40 | 2.40 | 2.40 |
| Wire nails, Pittsburgh | 2.65 | 2.65 | 2.65 | 2.65 |
| Wire nails, Chicago dist. mill | 2.70 | 2.70 | 2.70 | 2.70 |
| Plain wire, Pittsburgh | 2.50 | 2.50 | 2.50 | 2.50 |
| Plain wire, Chicago dist. mill | 2.55 | 2.55 | 2.55 | 2.55 |
| Barbed wire, galv., P'gh | 3.35 | 3.35 | 3.35 | 3.35 |
| Barbed wire, galv., Chicago dist. mill | 3.40 | 3.40 | 3.40 | 3.40 |
| Tin plate, 100 lb. box, P'gh | $5.50 | $5.50 | $5.50 | $5.50 |
| **Old Material,** Per Gross Ton: | | | | |
| Carwheels, Chicago | $15.25 | $15.25 | $16.00 | $17.50 |
| Carwheels, Philadelphia | 17.50 | 17.50 | 17.50 | 18.50 |
| Heavy steel scrap, P'gh | 18.00 | 18.50 | 17.50 | 19.00 |
| Heavy steel scrap, Phila | 17.00 | 17.00 | 16.00 | 17.50 |
| Heavy steel scrap, Ch'go | 14.25 | 14.25 | 14.00 | 16.25 |
| No. 1 cast, Pittsburgh | 16.50 | 17.00 | 17.00 | 17.50 |
| No. 1 cast, Philadelphia | 18.00 | 18.50 | 17.50 | 18.00 |
| No. 1 cast, Ch'go (net ton) | 17.00 | 17.00 | 17.00 | 18.00 |
| No. 1 RR. wrot., Phila | 17.50 | 18.00 | 18.00 | 17.50 |
| No. 1 RR. wrot., Ch'go (net) | 13.50 | 13.50 | 13.50 | 15.25 |
| **Coke, Connellsville,** Per Net Ton at Oven: | | | | |
| Furnace coke, prompt | $3.25 | $3.25 | $2.90 | $3.40 |
| Foundry coke, prompt | 4.25 | 4.25 | 4.00 | 4.25 |
| **Metals,** | | | | |
| *Per Lb. to Large Buyers:* | Cents | Cents | Cents | Cents |
| Lake copper, New York | 14.50 | 14.50 | 14.50 | 15.00 |
| Electrolytic copper, refinery | 14.07½ | 14.12½ | 14.25 | 14.62½ |
| Zinc, St. Louis | 7.47½ | 7.40 | 7.30 | 7.75 |
| Zinc, New York | 7.82½ | 7.75 | 7.65 | 8.10 |
| Lead, St. Louis | 8.50 | 8.65 | 8.50 | 9.25 |
| Lead, New York | 8.75 | 8.90 | 8.90 | 9.40 |
| Tin (Straits), New York | 68.87½ | 67.25 | 64.75 | 58.50 |
| Antimony (Asiatic), N. Y. | 16.25 | 16.25 | 16.75 | 17.12½ |

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

# Pittsburgh

## New Sheet Bases Generally Adopted—Pig Iron Affected by Higher Fuel

PITTSBURGH, Sept. 14.—There has been no let down since a week ago in steel plant operations in this and nearby districts, while there has been actually a slight increase in the Youngstown district. Meanwhile reports concerning incoming business are favorable, although in some products, notably in large structural shapes, specifications lately have been obtained only through more intensive effort. The rush of inquiry for fabricated steel, based on the desire of investors to have erection work well completed before the advent of winter, has subsided rather sharply, and inquiry for steel is, generally, not quite up to the recent rate.

The mills have plenty of sheet business, and with a good deal of line pipe being placed, the pipe producers are becoming well fortified against any slackening in the demand for other tubular products in the next few months. The demands from the automotive industry and of agricultural implement manufacturers are holding up well, but railroad business is better in prospective, than in actual, bookings. Makers of strip steel, cold-finished steel bars and bolts, nuts and rivets all have opened their books for fourth quarter contracts at unchanged prices, and some fourth quarter contracting for hot-rolled bars has been done at the same prices that ruled for the quarter now drawing to a close.

With the exception of these lines, however, contracting even for a quarterly period seems to be passing. Sheet consumers quite generally have reduced their buying to a 30-day basis, and in those cases where mills extend protection for a 90-day period the specifications, rather than the amount of tonnage set down for a customer, give the best picture of actual business.

Except on sheets, there are no suggestions of higher prices in the remainder of the year. The new base gages and gage differentials on black and galvanized sheets, which incidentally have found more general acceptance among manufacturers since a week ago, result in materially lower prices for the heavy gages and do not produce a commensurate increase in the prices on the lighter gages. Hence some manufacturers are already quoting No. 24 gage black at 3.10c., base Pittsburgh, and galvanized at 3.90c., while there are intimations that an advance to 4c. on No. 24 gage galvanized is being considered by some producers.

A strong market in coke, with indications that $3.50 per net ton at ovens will be the minimum on fourth quarter tonnages of furnace grade, or 50c. a ton higher than the general average on third quarter tonnages, is beginning to have some effect upon the pig iron market. Not enough business has been done in the past week in pig iron to clearly define the market, but merchant producers finally are beginning to show dissatisfaction over present prices, and with the prospect of paying a higher price for their last quarter fuel, are rather indifferent about booking additional business. The scrap market has weakened, following the recent sales which covered the immediate requirements of buyers, and with dealers showing little interest in

supplies, the steel works grades have declined about 50c. a ton since a week ago.

**Pig Iron.**—It looks very much as if the pig iron market had struck bottom and that the next change in prices would be upward. There is one inquiry for 2000 to 3000 tons of basic iron and another for 10,000 tons of that grade, and buyers are said to be having difficulty in finding supplies. One Youngstown steel company has been drawing on another one for enough iron to sustain its steel works operations, while a fair-sized tonnage of basic iron is moving from a Youngstown merchant furnace to another steel company in that district, with an inadequate supply. In the mean time, demands for foundry iron from the small users are so urgent as to indicate that they are not at all well supplied, and the larger consumers are drawing very steadily against their contracts. As present prices of all grades of iron are said to be unprofitable with coke costing $3 per net ton at ovens, there is naturally less tendency to take fourth quarter pig iron business at today's prices with the prospect that furnace coke for that period will cost $3.50, and possibly more. Large coke producers are fairly well obligated for the remainder of the year either on coke or coal, and a price of more than $3.50 would be necessary to induce them to put on additional coke ovens. The Pittsburgh Steel Co. has put on a blast furnace since a week ago, and one more furnace is in production at the Johnstown works of Bethlehem Steel Corporation, where eight of 10 furnaces are now active.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh districts being $1.76 per gross ton:

| | |
|---|---|
| Basic | $17.50 to $18.00 |
| Bessemer | 18.00 to 19.00 |
| Gray forge | 17.00 to 17.50 |
| No. 2 foundry | 17.50 to 18.00 |
| No. 3 foundry | 17.00 to 17.50 |
| Malleable | 17.50 to 18.50 |
| Low phosphorus, copper free | 27.50 |

**Ferroalloys.**—Sales of a few small lots of spiegeleisen are noted, but generally there is not much new business in the commonly used ferroalloys, nor is the situation much changed, except that the prospect is good for a greater supply of higher manganese content spiegeleisen in the last quarter of the year than has been available in the past three months. The leading commercial producer of this material expects to get a furnace now idle for repairs in production on Oct. 1. Prices are given on page 811.

**Semi-Finished Steel.**—There is continued lack of open-market transactions in the various forms of semi-finished steel and little evidence that the non-integrated manufacturers are much concerned about their fourth-quarter requirements. As is true of finished steel, the purchase of billets, slabs, sheet bars, wire rods and skelp has gone largely to a monthly basis, and with productive capacity ample and no danger of shortages, buyers no longer feel the need of big stocks or extended protection. The sheet makers have enough business in sight to encourage them to order out steel in good volume for October delivery, and with pipe business good, there are good specifications in skelp. Sheet makers would like to get sheet bars at less than $36, Pittsburgh, Youngstown or Cleveland, contending that even on the new bases they cannot come out even, but the attitude of sheet-bar makers is that the remedy is in higher prices for light-gage sheets rather than in lower prices for the raw materials. Prices are given on page 809.

**Wire Products.**—Manufacturers in this district still report a good movement of wire and a fairly strong demand for nails and fence and fencing material. General demand is sufficient to sustain a mill operation of around 60 per cent of capacity but not more than that, if additions to mill stocks are to be avoided. Consumers and jobbers seem to have been given a chance to cover against their early requirements in coated nails before the recent change in the size extras. Recent prices are holding; they are given on page 809.

**Rails and Track Supplies.**—Actual orders for standard-section rails and for the accessories are light, but the expectation is strong that orders of substantial proportions will be placed within the next 30 days and that some of the tonnage will be for shipment this year. It is reported here that the Boston & Maine Railroad has placed a large order for foreign rails. Leading makers of light billet rails have advanced prices to $36, base, per gross ton. The demand for these sections has not been over brisk, but makers say that recent prices of $33 to $34, at which they have been selling and at which they have business on their books, have been unprofitable. The new price does not affect business that has been booked. Prices are given on page 809.

**Tubular Goods.**—Pipe business continues good, and most producers are well filled up on lap-welded sizes for the next 30 days, while there are some companies, notably the leading producer, which already have enough line-pipe business to engage capacity into the winter. The National Tube Co., in addition to the order for 300 miles of 10-in. pipe recently received from the National Andean Corporation, has taken one for more than 200 miles of 8-in. plain-end, double-strength pipe for the Prairie Pipe Line Co. The approach of fall is quickening the demand for standard-weight pipe for heating installations, but, as a rule, makers are able to ship promptly against orders for this class of pipe, as against promises of two or four weeks in the lap-welded sizes. There is a good market for seamless oil country goods. Boiler tubes are selling steadily, but only in seamless steel tubes is there really satisfactory business. Discounts are given on page 809.

**Sheets.**—Adoption of the new card, establishing No. 24 gage as the base gage on black and galvanized sheets and setting up new gage differentials, has become even more general since a week ago, and it is now said that makers representing 90 per cent of the country's productive capacity have accepted it as the basis of business. Most mills are quoting black at 3c., base (No. 24 gage), Pittsburgh, for black and 3.85c., base (No.

## THE IRON AGE Composite Prices

### Finished Steel

**Sept. 14, 1926, 2.439c. Per Lb.**

| | |
|---|---|
| One week ago | 2.431c. |
| One month ago | 2.431c. |
| One year ago | 2.396c. |
| 10-year pre-war average | 1.689c. |

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

| | High | | Low | |
|---|---|---|---|---|
| *1926* | 2.453c., | Jan. 5; | 2.403c., | May 18 |
| *1925* | 2.560c., | Jan. 6; | 2.396c., | Aug. 18 |
| *1924* | 2.789c., | Jan. 15; | 2.460c., | Oct. 14 |
| *1923* | 2.824c., | April 24; | 2.446c., | Jan. 2 |

### Pig Iron

**Sept. 14, 1926, $19.46 Per Gross Ton**

| | |
|---|---|
| One week ago | $19.46 |
| One month ago | 19.46 |
| One year ago | 19.46 |
| 10-year pre-war average | 15.72 |

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

| | High | | Low | |
|---|---|---|---|---|
| *1926* | $21.54, | Jan. 5; | $19.46, | July 13 |
| *1925* | 22.50, | Jan. 13; | 18.96, | July 7 |
| *1924* | 22.88, | Feb. 26; | 19.21, | Nov. 3 |
| *1923* | 30.86, | March 20; | 20.77, | Nov. 20 |

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

*Soft Steel*

| | Base Per Lb. |
|---|---|
| F.o.b. Pittsburgh mills | 2.00c. to 2.10c. |
| F.o.b. Chicago | 2.10c. |
| Del'd Philadelphia | 2.32c. |
| Del'd New York | 2.34c. |
| Del'd Cleveland | 2.19c. |
| F.o.b. Birmingham | 2.15c. to 2.25c. |
| C.i.f. Pacific ports | 2.35c. |
| F.o.b. San Francisco mills | 2.35c. to 2.40c. |

*Billet Steel Reinforcing*

| | |
|---|---|
| F.o.b. Pittsburgh mills | 2.00c. to 2.10c. |

*Rail Steel*

| | |
|---|---|
| F.o.b. mill | 1.80c. to 1.90c. |
| F.o.b. Chicago | 2.00c. |

*Iron*

| | |
|---|---|
| Common iron, f.o.b. Chicago | 2.00c. |
| Refined iron, f.o.b. P'gh mills | 3.00c. |
| Common iron, del'd Philadelphia | 2.22c. |
| Common iron, del'd New York | 2.24c. |

## Tank Plates

| | Base Per Lb. |
|---|---|
| F.o.b. Pittsburgh mill | 1.90c. |
| F.o.b. Chicago | 2.10c. |
| F.o.b. Birmingham | 2.05c. to 2.15c. |
| Del'd Cleveland | 2.09c. |
| Del'd Philadelphia | 2.22c. |
| Del'd New York | 2.24c. |
| C.i.f. Pacific ports | 2.30c. |

## Structural Shapes

| | Base Per Lb. |
|---|---|
| F.o.b. Pittsburgh mill | 2.00c. to 2.10c. |
| F.o.b. Chicago | 2.10c. |
| F.o.b. Birmingham | 2.15c. to 2.25c. |
| Del'd Cleveland | 2.19c. |
| Del'd Philadelphia | 2.32c. |
| Del'd New York | 2.34c. |
| C.i.f. Pacific ports | 2.35c. |

## Hot-Rolled Flats (Hoops, Bands and Strips)

| | Base Per Lb. |
|---|---|
| All gages, narrower than 6 in., P'gh | 2.50c. |
| All gages, 6 in. and wider, P'gh | 2.30c. |
| All gages, 6 in. and narrower, Chicago | 2.60c. |
| All gages, wider than 6 in., Chicago | 2.50c. |
| Cotton ties, f.o.b. Atlantic ports, per bundle of 45 lb | $1.22 |
| Cotton ties, f.o.b. Gulf ports, per bundle of 45 lb. | 1.20 |

## Cold-Finished Steel

| | Base Per Lb. |
|---|---|
| Bars, f.o.b. Pittsburgh mills | 2.50c. |
| Bars, f.o.b. Chicago | 2.50c. |
| Bars, Cleveland | 2.55c. |
| Shafting, ground, f.o.b. mill | *2.70c. to 3.00c. |
| Strips, f.o.b. Pittsburgh mills | 3.50c. to 3.60c. |
| Strips, f.o.b. Cleveland mills | 3.50c. |
| Strips, delivered Chicago | 3.80c. to 3.90c. |
| Strips, f.o.b. Worcester mills | 3.75c. |

*According to size.

## Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

| | Base per Keg |
|---|---|
| Wire nails | $2.65 |
| Galv'd nails, 1-in. and longer | 4.65 |
| Galv'd nails, shorter than 1-in. | 4.90 |
| Galvanized staples | 3.35 |
| Polished staples | 3.10 |
| *Cement coated nails | 2.65 |

*Subject to new card of extras dated Sept. 1, 1926.

| | Base Per 100 Lb. |
|---|---|
| Bright plain wire, No. 9 gage | $2.50 |
| Annealed fence wire | 2.65 |
| Spring wire | 3.50 |
| Galv'd wire, No. 9 | 3.10 |
| Barbed wire, galv'd | 3.35 |
| Barbed wire, painted | 3.10 |

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

*Woven Wire Fence*

| | Base to Retailers Per Net Ton |
|---|---|
| F.o.b. Pittsburgh | $65.00 |
| F.o.b. Cleveland | 65.00 |
| F.o.b. Anderson, Ind. | 66.00 |
| F.o.b. Chicago district mills | 67.00 |
| F.o.b. Duluth | 68.00 |
| F.o.b. Birmingham | 68.00 |

## Sheets

*Blue Annealed*

| | Base Per Lb. |
|---|---|
| Nos. 9 and 10, f.o.b. Pittsburgh | 2.25c. to 2.30c. |
| Nos. 9 and 10, f.o.b. Ch'go dist. mill | 2.40c. |
| Nos. 9 and 10, del'd Philadelphia | 2.62c. |

*Box Annealed, One Pass Cold Rolled*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 3.00c. |
| No. 24, f.o.b. Ch'go dist. mill | 3.10c. |
| No. 24, del'd Philadelphia | 3.32c. |

*Galvanized*

| | |
|---|---|
| No. 24, f.o.b. Pittsburgh | 3.85c. |
| No. 24, f.o.b. Chicago dist. mill | 3.95c. |
| No. 24, del'd Philadelphia | 4.17c. |

*Tin Mill Black Plate*

| | |
|---|---|
| No. 28, f.o.b. Pittsburgh | 3.15c. |
| No. 28, f.o.b. Chicago dist. mill | 3.25c. |

*Automobile Body Sheets*

| | |
|---|---|
| No. 20, f.o.b. Pittsburgh | 4.25c. |

*Long Ternes*

| | |
|---|---|
| No. 28, 8-lb. coating, f.o.b. mill | 4.65c. |

## Tin Plate

| | Per Base Box |
|---|---|
| Standard cokes, f.o.b. P'gh district mills | $5.50 |
| Standard cokes, f.o.b. Gary and Elwood, Ind. | 5.60 |

## Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

| | |
|---|---|
| 8-lb. coating, 100 lb. base | $11.40 |
| 8-lb. coating I.C. | 11.70 |
| 15-lb. coating I.C. | 14.85 |
| 20-lb. coating I.C. | $16.20 |
| 25-lb. coating I.C. | 17.90 |
| 30-lb. coating I.C. | 19.45 |
| 40-lb. coating I.C. | 21.65 |

## Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

| S. A. E. Series Numbers | | Base Per 100 Lb. |
|---|---|---|
| 2100* | (1½% Nickel, 0.10% to 0.20% Carbon) | $3.20 to $3.25 |
| 2300 | (3½% Nickel) | 4.40 to 4.50 |
| 2500 | (5% Nickel) | 5.50 to 5.65 |
| 3100 | (Nickel Chromium) | 3.40 to 3.50 |
| 3200 | (Nickel Chromium) | 5.00 to 5.25 |
| 3300 | (Nickel Chromium) | 7.00 to 7.25 |
| 3400 | (Nickel Chromium) | 6.25 to 6.50 |
| 5100 | (Chromium Steel) | 3.40 to 3.50 |
| 5200* | (Chromium Steel) | 7.00 to 7.50 |
| 6100 | (Chrom. Vanadium bars) | 4.30 |
| 6100 | (Chrom. Vanad. spring steel) | 3.80 |
| 9250 | (Silicon Manganese spring steel) | 3.20 to 3.25 |
| | Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.) | 4.10 to 4.20 |
| | Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.) | 4.30 |
| | Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.) | 4.25 to 4.35 |
| | Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.) | 3.40 to 3.50 |
| | Chromium Molybdenum spring steel (1—1.25 Chrom., 0.20—0.50 Molybdenum) | 4.50 to 4.75 |

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

## Rails

| | Per Gross Ton |
|---|---|
| Standard, f.o.b. mill | $42.00 |
| Light (from billets), f.o.b. mill | $33.00 to 34.00 |
| Light (from rail steel), f.o.b. mill | 31.00 to 32.00 |
| Light (from billets), f.o.b. Ch'go mill | 26.00 to 28.00 |

## Track Equipment

(F.o.b. Mill)

| | Base Per 100 Lb. |
|---|---|
| Spikes, ⅜ in. and larger | $2.90 to $3.00 |
| Spikes, ½ in. and smaller | 2.90 to 3.25 |
| Spikes, boat and barge | 3.25 |
| Track bolts, all sizes | 3.90 to 4.40 |
| Tie plates, steel | 2.25 to 2.35 |
| Angle bars | 2.75 |

## Welded Pipe

**Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills**

*Butt Weld*

| Steel Inches | Black | Galv. | Iron Inches | Black | Galv. |
|---|---|---|---|---|---|
| ⅛ | 46 | 19½ | ⅛ to ⅜ | +11 | +39 |
| ¼ to ⅜ | 51 | 25½ | ½ | 32 | 2 |
| ½ | 56 | 42½ | ¾ | 28 | 11 |
| ¾ | 60 | 45½ | 1 to 1½ | 30 | 13 |
| 1 to 3 | 62 | 50½ | | | |

*Lap Weld*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 55 | 43½ | 2 | 28 | 7 |
| 2½ to 6 | 59 | 47½ | 2½ | 26 | 11 |
| 7 and 8 | 56 | 43½ | 3 to 6 | 28 | 13 |
| 9 and 10 | 54 | 41½ | 7 to 12 | 26 | 11 |
| 11 and 12 | 53 | 40½ | | | |

*Butt Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| ⅛ | 41 | 24½ | ⅛ to ⅜ | +19 | +54 |
| ¼ to ⅜ | 47 | 30½ | ½ | 21 | 7 |
| ½ | 53 | 42½ | ¾ | 23 | 13 |
| ¾ | 58 | 47½ | 1 to 1½ | 30 | 14 |
| 1 to 1½ | 60 | 49½ | | | |
| 2 to 3 | 61 | 50½ | | | |

*Lap Weld, extra strong, plain ends*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 53 | 42½ | 2 | 23 | 9 |
| 2½ to 4 | 57 | 46½ | 2½ to 4 | 29 | 15 |
| 4½ to 6 | 56 | 45½ | 4½ to 6 | 28 | 14 |
| 7 to 8 | 52 | 39½ | 7 to 8 | 21 | 7 |
| 9 and 10 | 45 | 32½ | 9 to 12 | 16 | 2 |
| 11 and 12 | 44 | 31½ | | | |

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

## Boiler Tubes

**Base Discounts, f.o.b. Pittsburgh**

| Lap Welded Steel | | Charcoal Iron | |
|---|---|---|---|
| 2 to 2¼ in. | 27 | 1½ in. | +18 |
| 2½ to 3½ in. | 37 | 1¾ to 1½ in. | + 8 |
| 3 in. | 40 | 2 to 2¼ in. | — 2 |
| 3¼ to 3¾ in. | 43½ | 2½ to 3 in. | — 7 |
| 4 to 13 in. | 46 | 3¼ to 4½ in. | — 9 |

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

*Standard Commercial Seamless Boiler Tubes*

*Cold Drawn*

| | | | |
|---|---|---|---|
| 1 in. | 60 | 3 in. | 45 |
| 1¼ to 1½ in. | 52 | 3½ to 3½ in. | 47 |
| 1¾ in. | 36 | 4 in. | 50 |
| 2 to 2¼ in. | 31 | 4½, 5 and 6 in. | 45 |
| 2½ to 2¾ in. | 39 | | |

*Hot Rolled*

| | | | |
|---|---|---|---|
| 2 and 2¼ in. | 34 | 3½ and 3½ in. | 50 |
| 2½ and 2¾ in. | 42 | 4 in. | 55 |
| 3 in. | 48 | 4½, 5 and 6 in. | 48 |

Less carloads, 4 points less. Add $6 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

| | Per Cent Off List |
|---|---|
| Carbon, 0.10% to 0.20%, base | 55 |
| Carbon, 0.30% to 0.40%, base | 50 |

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

24 gage), for galvanized, but a few who figure that the new schedules do not yield a fair profit, owing to the reductions made in the heavy-gage sheets, are quoting 3.10c. and 3.90c. respectively. Makers of the pickled finishes, which include enameling stock and metal furniture sheets, are on a base of 3.10c., for No. 24 gage, subject to the new gage differentials. The American Sheet & Tin Plate Co. has not yet adopted No. 20 gage as the base gage on automobile-body sheets, to which most other makers have gone, naming 4.25c., base, which produces 4.40c. for No. 22 gage. There appears to be good observance of the new schedules on new business, but the real test of them will be in another month when orders taken prior to the change begin to run out. Mill operations are increasing, and the general average now is close to 90 per cent of capacity. The American Sheet & Tin Plate Co. last week operated at between 86 and 87 per cent and expects this week to get close to 90 per cent. Prices are given on page 809.

**Tin Plate.**—Good demand for tin plate is indicated by a continued high rate of mill engagement, with the leading producers still reporting a 92 per cent operation and independents not far from that mark. Another production and shipment record is likely for 1926, largely because the packing crops exceeded expectations but partly because of export demands occasioned by the British coal strike.

**Cold-Finished Steel Bars and Shafting.**—Mills have opened their books for fourth-quarter business at unchanged prices, and there has been a fair response on the part of consumers. Meanwhile, current demand is steady, and this month's shipments to date are keeping pace with those of the same period last month. The ordinary tonnage price is 2.50c., base, Pittsburgh.

**Steel and Iron Bars.**—A fair amount of fourth quarter business is being entered by mills in this district and at the same prices that ruled on third quarter contracts. This means that the smaller consumers will pay 2c., base Pittsburgh, and the large-tonnage buyers about $2 a ton less. There is a fair amount of current business carrying a price of 2c., base, and specifications on third quarter contracts are coming along well, although some urging is necessary by mills. Iron bars are still rather dull.

**Structural Steel.**—There has been a considerable slowing down in the demand for fabricated steel, and this is reflected in the orders and specifications for plain material. Mills seem more anxious for specifications than they were a few weeks ago. The plain material market is firm at 2c., base Pittsburgh, for ordinary tonnages.

**Plates.**—The market is holding steadily at 1.90c., base Pittsburgh, and river barges and line pipe are providing the mills with a fairly good operating schedule. Railroad car business, however, would be a welcome addition.

**Hot-Rolled Flats.**—Bookings in strips with makers in this district are running substantially higher so far this month than in the same period in August, and there is a good deal of urgency about deliveries, notably of rim stock for automobile wheels. Books have been opened for fourth quarter on hoops, bands and strips at unchanged prices, or 2.30c., base Pittsburgh, for stock 6 in. and wider and 2.50c., base, for narrower material.

**Cold-Rolled Strips.**—Business so far this month has been better than in the same period last month, but there continues to be considerable irregularity in prices. For cash registers, typewriters, adding machines, cream separators and other articles calling for steel of special analysis and usually selling in small lots, the market is quotable at from 3.50c. to 3.60c., base Pittsburgh, but on commercial quality steel selling in large tonnages these prices are being shaded $5 a ton or more.

**Bolts, Nuts and Rivets.**—Leading makers late last week opened their books for fourth quarter contracts at unchanged prices. It is now two years since there has been any change in the bolt and nut discounts. Current demands are fairly constant, although individually small. Prices and discounts are given on page 811.

**Warehouse Business.**—Effective Sept. 13, local jobbers adopted No. 24 gage as the base on black and galvanized sheets and announced 3.85c., base, on black and 4.50c., base, on galvanized for lots of 25 bundles or more.

**Coke and Coal.**—There is still marked firmness to the coke market, with spot furnace coke quotable from $3.25 to $3.50, while on tonnages for shipment over the last quarter of the year $3.50 is as low as any of them is quoting, while some are naming $3.75 and even $4. Steel company contracts of a few weeks ago have given several large operators enough business to carry them to the end of the year, while a curtailment of production by two producers so that they might ship coal account for an aggregate of about 100 000 tons of coke a month. A number of merchant furnaces still in blast and likely to remain in production until the end of the year have not closed for their fourth quarter requirements. Two furnaces now idle are seeking fourth quarter tonnages. As the labor supply is not any too large in the Connellsville district, coke producers are in the best position they have been in some time to dictate prices. There is an increasing demand for coke for water gas plants. Coal business is beginning to expand, but the supply is increasing also and prices are no stronger than they have been.

**Old Material.**—Last week's business seems to have marked a turning point in prices, and as against sales of No. 1 heavy-melting steel at $18.50 and even higher, the highest bid now obtainable on that grade is $18.25, while for the general run of offerings the market is appraised at $17.50 to $18. Recent sales seem to have covered the present requirements of buyers, and consumer interest in the market is again low. One mill is holding up shipments against purchases made at $18.25, and reports from primary points, notably Detroit, suggest difficulty in moving supplies except at slightly lower prices than could be secured recently. Not only is consumer interest lacking, but dealers short of the market are less eager for supplies.

### Warehouse Prices, f.o.b. Pittsburgh

| | Base per Lb. |
|---|---|
| Tank plates | 3.00c. |
| Structural shapes | 3.00c. |
| Soft steel bars and small shapes | 2.90c. |
| Reinforcing steel bars | 2.90c. |
| Black sheets (No. 24 gage), 25 or more bundles | 3.85c. |
| Galvanized sheets (No. 24 gage), 25 or more bundles | 4.50c. |
| Blue annealed sheets (No. 10 gage), 25 or more sheets | 3.40c. |
| Cold-finished shafting and screw stock— | |
| Rounds and hexagons | 3.60c. |
| Squares and flats | 4.10c. |
| Bands | 3.60c. |
| Spikes, large | 3.30c. |
| Small | 3.80c. to 5.25c. |
| Boat | 3.80c. |
| Bolts, track | 4.90c. |
| Wire, black soft annealed, base per 100 lb. | $3.00 |
| Wire, galvanized soft, base per 100 lb. | 3.00 |
| Common wire nails, per keg | 3.00 |
| Cement coated nails | 3.05 |

We quote for delivery to consumers' yards in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

| | *Per Gross Ton* | |
|---|---|---|
| Heavy melting steel | $17.50 to | $18.25 |
| Scrap rails | 17.00 to | 17.50 |
| No. 1 cast, cupola size | 16.50 to | 17.00 |
| Compressed sheet steel | 16.50 to | 17.00 |
| Bundled sheets, sides and ends | 15.50 to | 16.00 |
| Railroad knuckles and couplers | 19.50 to | 20.00 |
| Railroad coil and leaf springs | 19.50 to | 20.00 |
| Low phosphorus blooms and billet ends | 22.00 to | 22.50 |
| Low phosphorus mill plates | 21.50 to | 22.00 |
| Low phosphorus, light grade | 18.00 to | 18.50 |
| Low phosphorus punchings | 19.00 to | 19.50 |
| Steel car axles | 22.50 to | 23.00 |
| Cast iron wheels | 16.50 to | 17.00 |
| Rolled steel wheels | 19.50 to | 20.00 |
| Machine shop turnings | 13.00 to | 13.50 |
| Short shoveling steel turnings | 14.00 to | 14.50 |
| Sheet bar crops | 18.00 to | 19.00 |
| Heavy steel axle turnings | 15.50 to | 16.00 |
| Short mixed borings and turnings | 13.00 to | 13.50 |
| Heavy breakable cast | 16.00 to | 16.50 |
| Cast iron borings | 13.00 to | 13.50 |
| No. 1 railroad wrought | 14.00 to | 14.50 |
| No. 2 railroad wrought | 17.50 to | 18.25 |
| Railroad or automobile malleable scrap | 18.00 to | 18.50 |

# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel

**F.o.b. Pittsburgh or Youngstown**

### Billets and Blooms

| | *Per Gross Ton* |
|---|---|
| Rerolling, 4-in. and over | $35.00 |
| Rerolling, 2-in. and smaller | 36.00 |
| Forging, ordinary | 40.00 |
| Forging, guaranteed | 45.00 |

### Sheet Bars

| | *Per Gross Ton* |
|---|---|
| Open-hearth or Bessemer | $36.00 |

### Slabs

| | *Per Gross Ton* |
|---|---|
| 8 in. x 2 in. and larger | $35.00 |
| 6 in. x 2 in. and smaller | 36.00 |

### Skelp

| | *Per Lb.* |
|---|---|
| Grooved | 1.90c. |
| Sheared | 1.90c. |
| Universal | 1.90c. |

### Wire Rods

| | *Per Gross Ton* |
|---|---|
| *Common soft, base | $45.00 |
| Screw stock | $5.00 per ton over base |
| Carbon 0.20% to 0.40% | 3.00 per ton over base |
| Carbon 0.41% to 0.55% | 5.00 per ton over base |
| Carbon 0.56% to 0.75% | 7.50 per ton over base |
| Carbon over 0.75% | 10.00 per ton over base |
| Acid | 15.00 per ton over base |

*Chicago mill base is $46. Cleveland mill base, $45.

## Prices of Raw Materials

### Ores

*Lake Superior Ores, Delivered Lower Lake Ports*

| | *Per Gross Ton* |
|---|---|
| Old range Bessemer, 51.50% iron | $4.55 |
| Old range non-Bessemer, 51.50% iron | 4.40 |
| Mesabi Bessemer, 51.50% iron | 4.40 |
| Mesabi non-Bessemer, 51.50% iron | 4.25 |
| High phosphorus, 51.50% iron | 4.15 |

*Foreign Ore, c.i.f. Philadelphia or Baltimore*

| | *Per Unit* |
|---|---|
| Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian | 9.50c. to 10c. |
| Iron ore, Swedish, average 66% iron | 9.50c. |
| Manganese ore, washed, 51% manganese, from the Caucasus | 40c. to 42c. |
| Manganese ore, high grade, nominal | 35c. to 44c. |
| Tungsten ore, high grade, per unit, in 60% concentrates | $11.75 to $12.50 |
| | *Per Ton* |
| Chrome ore, Indian basic, 48% $Cr_2O_3$, crude, c.i.f. Atlantic seaboard | $22.50 |
| | *Per Lb.* |
| Molybdenum ore, 85% concentrates of $MoS_2$, delivered | 50c. to 55c. |

### Coke

| | *Per Net Ton* |
|---|---|
| Furnace, f.o.b. Connellsville prompt | $3.25 to $3.50 |
| Foundry, f.o.b. Connellsville prompt | 4.25 to 4.75 |
| Foundry, by-product, Ch'go ovens | 9.75 |
| Foundry, by-product, New England, del'd | 12.00 |
| Foundry, by-product, Newark or Jersey City, delivered | 9.59 to 10.77 |
| Foundry, Birmingham | 5.50 to 6.00 |
| Foundry, by-product, St. Louis or Granite City | 10.00 |

### Coal

| | *Per Net Ton* |
|---|---|
| Mine run steam coal, f.o.b. W. Pa. mines | $1.40 to $1.75 |
| Mine run coking coal, f.o.b. W. Pa. mines | 1.50 to 1.75 |
| Mine run gas coal, f.o.b. Pa. mines | 1.85 to 2.00 |
| Steam slack, f.o.b. W. Pa. mines | 1.10 to 1.20 |
| Gas slack, f.o.b. W. Pa. mines | 1.20 to 1.30 |

### Ferromanganese

| | *Per Gross Ton* |
|---|---|
| Domestic, 80%, furnace or seab'd. | $88.00 to $95.00 |
| Foreign, 80%, Atlantic or Gulf port, duty paid | 88.00 |

### Spiegeleisen

| | *Per Gross Ton Furnace* |
|---|---|
| Domestic, 19 to 21% | $32.00 to $34.00 |
| Domestic, 16 to 19% | 31.00 to 33.00 |

### Electric Ferrosilicon

| | *Per Gross Ton Delivered* |
|---|---|
| 50% | $85.00 to $87.50 |
| 75% | 145.00 to 150.00 |

| *Per Gross Ton Furnace* | | *Per Gross Ton Furnace* | |
|---|---|---|---|
| 10% | $35.00 | 12% | $39.00 |
| 11% | 37.00 | 14 to 16% | 45 to 46.00 |

### Bessemer Ferrosilicon

**F.o.b. Jackson County, Ohio, Furnace**

| *Per Gross Ton* | | *Per Gross Ton* | |
|---|---|---|---|
| 10% | $33.00 | 12% | $37.00 |
| 11% | 35.00 | | |

### Silvery Iron

**F.o.b. Jackson County, Ohio, Furnace**

| *Per Gross Ton* | | *Per Gross Ton* | |
|---|---|---|---|
| 6% | $25.50 | 10% | $31.00 |
| 7% | 26.50 | 11% | 33.00 |
| 8% | 27.50 | 12% | 35.00 |
| 9% | 29.00 | | |

### Other Ferroalloys

| | |
|---|---|
| Ferrotungsten, per lb. contained metal, del'd | $1.05 to $1.20 |
| Ferrochromium, 4% carbon and up, 60 to 70% Cr., per lb. contained Cr. delivered | 11.50c. |
| Ferrovanadium, per lb. contained vanadium, f.o.b. furnace | $3.25 to $4.00 |
| Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads | $200.00 |
| Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton | $91.00 |
| Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton | $122.50 |

### Fluxes and Refractories

**Fluorspar**

| | *Per Net Ton* |
|---|---|
| Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines | $17.00 to $18.00 |
| No. 2 lump, Illinois and Kentucky mines | $20.00 |
| Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid, | $17.00 to $17.50 |
| Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines | $32.50 |

**Fire Clay**

*Per 1000 f.o.b. Works*

| | High Duty | Moderate Duty |
|---|---|---|
| Pennsylvania | $40.00 to $43.00 | $38.00 to $40.00 |
| Maryland | 43.00 to 46.00 | 36.00 to 40.00 |
| New Jersey | 55.00 to 75.00 | |
| Ohio | 40.00 to 43.00 | 36.00 to 40.00 |
| Kentucky | 40.00 to 43.00 | 36.00 to 40.00 |
| Illinois | 40.00 to 43.00 | 35.00 to 38.00 |
| Missouri | 40.00 to 43.00 | 35.00 to 38.00 |
| Ground fire clay, per ton | 6.50 to 7.50 | |

**Silica Brick**

| | *Per 1000 f.o.b. Works* |
|---|---|
| Pennsylvania | $45.00 |
| Chicago | 52.00 |
| Birmingham | 50.00 |
| Silica clay, per ton | $8.00 to 9.00 |

**Magnesite Brick**

| | *Per Net Ton* |
|---|---|
| Standard sizes, f.o.b. Baltimore and Chester, Pa. | $65.00 |
| Grain magnesite, f.o.b. Baltimore and Chester, Pa. | 40.00 |

**Chrome Brick**

| | *Per Net Ton* |
|---|---|
| Standard size | $45.00 to $50.00 |

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

### Bolts and Nuts

*(Less-than-Carload Lots)*

**(F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)**

| | *Per Cent Off List* |
|---|---|
| Machine bolts, small, rolled threads | 60 and 10 |
| Machine bolts, all sizes, cut threads | 50, 10 and 10 |
| Carriage bolts, smaller and shorter, rolled threads | 50, 10 and 10 |
| Carriage bolts, cut threads, all sizes | 50 and 10 |
| Eagle carriage bolts | 65 and 10 |
| Lag bolts | 60, 10 and 10 |
| Plow bolts, Nos. 3 and 7 heads | 50 and 10 |
| (Extra of 20% for other style heads) | |
| Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in., | 45, 10 and 5 |
| Larger and longer sizes | 45, 10 and 5 |
| Bolt ends with hot-pressed nuts | 50, 10 and 10 |
| Bolt ends with cold-pressed nuts | 45, 10 and 5 |
| Hot-pressed nuts, blank and tapped, square, | 4.00c. per lb. off list |
| Hot-pressed nuts, blank or tapped, hexagons, | 4.40c. per lb. off list |
| C.p.c. and t. square or hex. nuts, blank or tapped | 4.10c. per lb. off list |
| Washers* | 6.50c. to 6.25c. per lb. off list |

*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent more than above for car lots. On hot-pressed and cold-punched nuts the discount is 25c. more per 100 lb. than quoted above for car lots.

### Bolts and Nuts

(Quoted with actual freight allowed up to but not exceeding 50c. per 100 lb.)

| | *Per Cent Off List* |
|---|---|
| Semi-finished hexagon nuts: | |
| ⅜ in. and smaller, U. S. S. | 80, 10 and 5 |
| ½ in. and larger, U. S. S. | 75, 10 and 5 |
| Small sizes, S. A. E. | 80, 10, 10 and 5 |
| S. A. E., ⅝ in. and larger | 75, 10, 10 and 5 |
| Stove bolts in packages | 80 and 10 |
| Stove bolts in bulk | 80, 10 and 2½ |
| Tire bolts | 60 and 5 |

### Semi-Finished Castellated and Slotted Nuts

(Actual freight allowed up to but not exceeding 50c. per 100 lb.)

(To jobbers and consumers in large quantities)

| | Per 100 Net S.A.E. | U.S.S. | | Per 100 Net S.A.E. | U.S.S. |
|---|---|---|---|---|---|
| ⅛-in. | $0.44 | $0.44 | ⅝-in. | $2.25 | $2.40 |
| ¼-in. | 0.515 | 0.515 | ¾-in. | 3.60 | 3.60 |
| 5/16-in. | 0.62 | 0.66 | 1-in. | 5.55 | 5.80 |
| ⅜-in. | 0.79 | 0.90 | 1⅛-in. | 8.90 | 8.90 |
| 7/16-in. | 1.01 | 1.05 | 1¼-in. | 12.60 | 13.10 |
| ½-in. | 1.38 | 1.42 | 1⅜-in. | 18.25 | 18.35 |
| 9/16-in. | 1.70 | 1.73 | 1½-in. | 21.00 | 21.00 |

Larger sizes.—Prices on application.

### Large Rivets

| | *Base Per 100 Lb.* |
|---|---|
| F.o.b. Pittsburgh | $2.50 to $2.60 |
| F.o.b. Cleveland | 2.70 |
| F.o.b. Chicago | 2.60 to 2.75 |

### Small Rivets

| | *Per Cent Off List* |
|---|---|
| F.o.b. Pittsburgh | 70 and 10 |
| F.o.b. Cleveland | 70, 10 and 5 to 70 and 10 |
| F.o.b. Chicago | 70, 10 and 5 to 70 and 10 |

### Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb.)

| | *Per Cent Off List* |
|---|---|
| Milled cap screws | 80 and 10 |
| Milled standard set screws, case hardened, | 80 and 5 |
| Milled headless set screws, cut thread | 80 |
| Upset hex. head cap screws, U. S. S. thread, | 80, 10 and 10 |
| Upset hex. cap screws, S.A.E. thread, | 80, 10 and 10 |
| Upset set screws | 80, 10 and 5 |
| Milled studs | 70 and 5 |

# Chicago

## Rail Inquiries Total 65,000 Tons—Cast Iron Pipe Weaker

CHICAGO, Sept. 14.—Mills continue to be engaged at between 80 and 85 per cent of ingot capacity, and deliveries on finished steel products stand where they did at the beginning of the month. Manufacturing consumers, generally, are busy, and current specifications appear to be a true reflection of actual consumptive demand. The farm implement industry is showing greater activity and is confidently preparing for a busy fall trade. In both specifications and new business the past week is on a par with the previous seven days, while inquiry has more than doubled, this being largely due, however, to rail inquiries, which now total close to 65,000 tons. New business thus far in September is slightly ahead of, and specifications are about equal to, shipments.

The demand for mild steel bars is unusually heavy, with users actively in the market for fourth quarter requirements. Local producers estimate that fully 575,000 tons of standard-section rails and accessories will be contracted for this fall and that a considerable part of that tonnage will be specified for fall delivery. Reports are current that a large railroad entering Chicago will soon be in the market for cars. In the mean time car-building is at a low ebb, and the situation is causing some concern in the steel trade. The Inland Steel Co. placed in operation Sept. 13 its 24-in. structural mill and its 36-in. blooming mill, which have been down one week for electrification.

**Pig Iron.**—New transactions in pig iron for the week are only in fair volume. Spot buying was about equal to that of the previous seven days, and several sizable tonnages were placed for delivery during the fourth quarter. An Indiana user has bought 1500 tons of Northern iron for delivery over the remainder of the year from the Valley. Shipments by Chicago district producers for September are running ahead of those for the first half of August, and the trade believes that the pig iron now being taken represents the actual melt in this district. Furnace operations are unchanged, and stocks in the hands of producers are gradually being reduced and are not so well balanced as during the latter part of the summer. Sellers do not believe that all users are covered for the final quarter, and they anticipate that contracting will become more active during the next two weeks. Some interest is being shown in first quarter iron, although the tonnage placed to date is not large. Sales of silvery and charcoal iron are small and widely scattered.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

| | |
|---|---|
| Northern No. 2 foundry, sil. 1.75 to 2.25 | $21.00 |
| Northern No. 1 foundry, sil. 2.25 to 2.75 | 21.50 |
| Malleable, not over 2.25 sil. | 21.00 |
| High phosphorus | 21.00 |
| Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago | 29.04 |
| Southern No. 2 (all rail) | 27.01 |
| Southern No. 2 (barge and rail) | 25.18 |
| Low phos., sil. 1 to 2 per cent, copper free | $29.50 to 30.00 |
| Silvery, sil. 8 per cent | 32.29 |
| Bessemer ferrosilicon, 14 to 15 per cent | 45.79 |

**Ferroalloys.**—This market is quiet and without features. Prices, as a rule, are steady, although it is reported that an offer of $88, seaboard, was refused on ferromanganese for delivery into the first quarter.

We quote 80 per cent ferromanganese, $95.56, delivered Chicago; 50 per cent ferrosilicon, $85, delivered; spiegeleisen, 18 to 22 per cent, $41.56, delivered Chicago.

**Sheets.**—The Inland Steel Co. announces, effective Sept. 14, an advance of $2 a ton on sheets. This company placed the new bases and differentials on black and galvanized in effect last week and is now quoting 3.25c. for No. 24 black, 2.55c. for No. 10 blue annealed and 4.10c. for No. 24 galvanized, all delivered at Chicago. The demand for sheets is slowly expanding, and deliveries are extending.

Chicago delivered prices from mill are 3.15c. for No. 24 black; 2.45c. for No. 10 blue annealed; 4c. for No. 24 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

**Plates.**—Orders for 3500 tons of steel have been placed for oil storage tanks to be erected in the Southwest. Fresh inquiry totals close to 6000 tons. The railroad equipment market is dull and is viewed with concern both by car builders and the steel trade. It is now reported that the Missouri Pacific and the Wabash will jointly build the 2000 refrigerator cars which were recently inquired for by the American Refrigerator Transit Co. The underframes may be contracted for and it is possible that the fabrication of structural members of the car bodies will be placed with car builders, but the cars will be assembled in the railroad shops. Mills expect to book 14,000 tons of steel for these cars. The 30 coaches placed by the New York Central with the Pullman Car & Mfg. Corporation will require about 700 tons of plates, shapes and bars. Mill prices on plates are steady at 2.10c., Chicago.

The mill quotation on plates is 2.10c. per lb., base, Chicago.

**Structural Material.**—The Pittsfield Building, Chicago, the contract for which will probably be placed next week, calls for 8400 tons of structural steel. Competition for this job is keen, as it is the largest building which has come before the trade for some time. On the whole, the building industry appears to be slowing down, and many attribute this to the uncertain attitude of labor throughout this district. Many projects of 500 tons and over have been figured, and fabricators had hoped that much of that business would be placed by this time. A fair number of small awards and inquiries are being made from day to day; in fact, shop estimators are being pressed for figures on work of that kind. Structural mills are well engaged and have fair backlogs, considering the prevalence of hand-to-mouth buying, but there is growing apprehension concerning the market outlook in view of the lack of demand from the railroads. Mill prices on plain material are holding at 2.10c., Chicago.

The mill quotation on plain material is 2.10c. per lb. base, Chicago.

**Bars.**—Users of mild steel bars are actively in the market, and Chicago mills have taken an unusually large volume of business for delivery over the remainder of the year at the ruling price of 2.10c., base Chicago. Specifications, on the whole, are satisfactory and are being received at about the rate of the previous week. Billet steel reinforcing bar warehouses are still taking fair tonnages, and there is a noticeable increase in the demand from makers of agricultural machinery. For the week new business is considerably ahead of shipments, and specifications are equal to mill deliveries. Users of iron bars are showing little interest in the market, and both new business and specifications are light. Bar iron prices are unchanged at 2c., Chicago. The demand for rail steel bars is steady, and the ruling price remains 2c., Chicago. In shipments of rail steel bars September is keeping pace with August. Deliveries average three and one-half weeks. Specifications from bed manufacturers are light, but barn equipment makers are taking larger tonnages and are asking for prompt shipment in view of small stocks on hand. Shipments of fence posts are in good volume, and a fair part of mill production is going into reinforcing work. One mill at Chicago Heights will complete three years of double-turn operations on Oct. 1. The only break in this record was seven working days lost in August, this year, when the mill was shut down for electrification.

Mill prices per lb. are: Mild steel bars, 2.10c., base, Chicago; common bar iron, 2c., base, Chicago; rail steel bars, 2c., base, Chicago.

**Wire Products.**—Although weather conditions the past week have been unfavorable to crops, business from the jobbing trade shows practically no change. Heavy rains throughout the West not only have caused

some damage to crops, but have seriously interfered with railroad service, thereby impeding the distribution of wire products. Stocks in the hands of consumers are low, and the failure to receive shipments as anticipated has caused some inconvenience. The manufacturing trade, in particular, is working on a close margin of stocks; in fact, so much so that in some cases buyers who have been receiving shipments by water and rail are asking for all-rail routing. While mill stocks are in fair balance, makers are not in position to meet delivery demands on all products. Meanwhile there is a tendency for mill operations to expand. The manufacturing trade is well covered by contracts for the fourth quarter. Mill prices, which are steady, are shown on page 809.

**Bolts, Nuts and Rivets.**—Both new business and specifications from the railroads have declined sharply. Specifications from other industries are holding up well, and heavier releases are coming from makers of farm machinery. Fourth quarter contracts are now being signed, and makers report that virtually no resistance is being offered by purchasers. Prices are steady, and new contracts for stove bolts are being taken at the advance to 80 and 10 per cent off list in packages and 80, 10 and 2½ off list in bulk.

**Rails and Track Supplies.**—The fall rail-buying movement is getting under way, and mills believe that specifications for fall delivery will be in good volume. It is estimated that approximately 575,000 tons of standard-section rails and accessories will be contracted for this fall. Inquiries now before the trade total 64,000 tons, and miscellaneous rail orders taken by Chicago mills this week amounted to 10,000 tons. Track supply business in this territory is light. The Louisville & Nashville is inquiring for 1500 kegs of spikes, 3500 kegs of track bolts and 25,000 pairs of angle bars.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, $36 to $38 per gross ton, f.o.b. maker's mill.

Standard railroad spikes, 2.90c. per lb. mill; track bolts with square nuts, 3.90c. mill; steel tie plates, 2.35c. mill; angle bars, 2.75c. mill.

**Cold-Rolled Strip.**—Demand is active for small tonnages, which are being booked at 3.90c., delivered Chicago. Attractive tonnages are being taken at 3.80c., delivered.

**Cast Iron Pipe.**—Although there is a substantial amount of business both in small and large tonnages, prices of cast iron pipe in this territory lack strength. The average quotation on small tonnages is close to $41, Birmingham, for 6-in. and larger diameters, but attractive business has brought out prices $2 below that figure. The ruling market now ranges from $39 to $41, base Birmingham, or $47.20 to $49.20. The National Cast Iron Pipe Co. has taken 770 tons of 6 and 8-in. Class B pipe for Chicago at $39, Birmingham. The American Cast Iron Pipe Co. is low bidder on 100 tons of 3 to 24-in. fittings for Chicago. It is reported that the United States Cast Iron Pipe & Foundry Co. is low bidder at Detroit on 6500 tons of 8, 12 and 16-in. Classes B and C pipe, with a price of $45.95, delivered. Grayville, Ill., has awarded 130 tons of 4-in. Class B pipe to the McWane Cast Iron Pipe Co., and the Lynchburg Foundry Co. is low bidder on 437 tons of 6 and 8-in. Class B pipe for Royal Oak, Mich. Oak Park, Ill., will open bids Sept. 21 on 145 tons of 6 and 12-in. Class B pipe.

We quote per net ton, delivered, Chicago, as follows: Water pipe, 4-in., $51.20 to $53.20; 6-in. and over, $47.20 to $49.20; Class A and gas pipe, $4 extra.

**Reinforcing Bars.**—The market is unusually quiet, considering the large number of outstanding quotations. The lack of lettings is more noticeable in projects of 100 tons each and over than in the small-tonnage jobs. There is a good volume of shipments from warehouses, which are booked for six to eight weeks. While there has been no real test of billet bar prices, smaller contracts placed recently have been bringing 2.40c. to 2.60c. per lb., warehouse. Fresh inquiries and recent awards are shown on page 825.

**Old Material.**—The market is showing definite signs of weakness, following the failure of the recent speculative movement, sponsored by dealers, to stimulate buying by consumers. While users are apparently out of the market, in reality they are simply waiting for dealers to make offers. The bulk of the scrap moving is being sold in that way, since sellers, in the absence of inquiry, are being forced to look for business. As to the immediate future, opinion is divided, some observers believing that the present price level will show little change and others looking for lower prices throughout the list. Heavy melting steel is quiet, and offers by users are not above $14.75 per gross ton, delivered. Bids on railroad lists are still higher than the market, but not to the same extent as earlier in the month. The recent Santa Fe list brought $18 per gross ton on track for rolled steel wheels, $18.25 per gross ton on track for coil springs, $17 per gross ton on track for couplers and $14 per net ton on track for No. 1 wrought. The Rock Island is offering 4000 tons.

We quote delivered in consumers' yards, Chicago and vicinity, all freight and transfer charges paid for all items, except relaying rails, including angle bars to match, which are quoted f.o.b. dealers' yards:

*Per Gross Ton*

| | |
|---|---|
| Heavy melting steel | $14.25 to $14.75 |
| Frogs, switches and guards, cut apart, and miscellaneous rails | 16.00 to 16.50 |
| Shoveling steel | 14.00 to 14.50 |
| Hydraulic compressed sheets | 12.75 to 13.25 |
| Drop forge flashings | 9.50 to 10.00 |
| Forged cast and rolled steel car-wheels | 17.50 to 18.00 |
| Railroad tires, charging box size | 18.25 to 18.75 |
| Railroad leaf springs, cut apart | 18.00 to 18.50 |
| Steel couplers and knuckles | 17.50 to 18.00 |
| Coil springs | 18.50 to 19.00 |
| Low phosphorus punchings | 17.00 to 17.50 |
| Axle turnings, foundry grade | 14.50 to 15.00 |
| Axle turnings, blast fur. grade | 12.50 to 13.00 |
| Relaying rails, 56 to 60 lb. | 25.50 to 26.50 |
| Relaying rails, 65 lb. and heavier | 26.00 to 31.00 |
| Rerolling rails | 17.50 to 18.00 |
| Steel rails, less than 3 ft. | 17.50 to 18.00 |
| Iron rails | 14.50 to 15.00 |
| Cast iron borings | 11.50 to 12.00 |
| Short shoveling turnings | 11.50 to 12.00 |
| Machine shop turnings | 8.00 to 8.50 |
| Railroad malleable | 17.50 to 18.00 |
| Agricultural malleable | 15.50 to 16.00 |
| Angle bars, steel | 16.25 to 16.75 |
| Cast iron carwheels | 15.25 to 15.75 |

*Per Net Ton*

| | |
|---|---|
| No. 1 machinery cast | 17.00 to 17.50 |
| No. 1 railroad cast | 16.25 to 16.75 |
| No. 1 agricultural cast | 16.25 to 16.75 |
| Stove plate | 14.50 to 15.00 |
| Grate bars | 14.25 to 14.75 |
| Brake shoes | 13.75 to 14.25 |
| Iron angle and splice bars | 14.00 to 14.50 |
| Iron arch bars and transoms | 20.00 to 20.50 |
| Iron car axles | 23.00 to 23.50 |
| Steel car axles | 17.50 to 18.00 |
| No. 1 railroad wrought | 13.50 to 14.00 |
| No. 2 railroad wrought | 12.50 to 13.00 |
| No. 1 busheling | 11.50 to 12.00 |
| No. 2 busheling | 7.50 to 8.00 |
| Locomotive tires, smooth | 17.00 to 17.50 |
| Pipes and flues | 10.00 to 10.50 |

**Warehouse Prices, f.o.b. Chicago**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.10c. |
| Mild steel bars | 3.00c. |
| Reinforcing bars, billet steel | 2.40c. to 2.60c. |
| Cold-finished steel bars and shafting— | |
| Rounds and hexagons | 3.60c. |
| Flats and squares | 4.10c. |
| Hoops | 4.15c. |
| Bands | 3.65c. |
| No. 24 black sheets | 3.95c. |
| No. 10 blue annealed sheets | 3.50c. |
| No. 24 galvanized sheets | 4.30c. |
| Standard railroad spikes | 3.55c. |
| Track bolts | 4.55c. |
| Structural rivets | 3.50c. |
| Boiler rivets | 3.70c. |

| | Per Cent Off List |
|---|---|
| Machine bolts | 50 and 5 |
| Carriage bolts | 47½ |
| Coach or lag screws | 55 and 5 |
| Hot-pressed nuts, square, tapped or blank, 3.25c. off per lb. | |
| Hot-pressed nuts, hexagons, tapped or blank, 3.75c. off per lb. | |
| No. 8 black annealed wire, per 100 lb. | $3.30 |
| Common wire nails, base, per keg | 3.05 |
| Cement coated nails, base, per keg | 3.05 |

# Philadelphia

## New England and Buffalo Pig Iron May Invade Philadelphia District

PHILADELPHIA, Sept. 14.—A new source of competition for eastern Pennsylvania pig iron develops from the completion of arrangements for the transport of iron by water from Buffalo furnaces and the furnace of the Mystic Iron Works at Everett, Mass., to Philadelphia. The appointment of a Philadelphia sales agent by the Mystic furnace lends substance to recent reports that outside domestic iron would come into this district. A water freight rate of about $2 a ton from Boston will enable the Everett furnace to compete on a fairly even basis with eastern Pennsylvania iron, while the statement is made in the pig iron trade here that it is now possible to bring iron from Buffalo by water for $2.50 a ton. In view of these circumstances there is not likely to be any advance in prices of eastern Pennsylvania iron, though the market is firm and furnaces are comfortable as to orders on their books.

Steel buying thus far in September has kept up the pace of August. Some of the sheet mills find themselves well loaded with orders, the buying movement preceding the change to the new base prices having been heavier than was generally anticipated. In some instances deliveries on black and galvanized sheets extend into November.

The scrap market has turned weaker, and there are reductions of 50c. a ton on many grades.

**Pig Iron.**—More fourth quarter buying has developed within the last week, mostly in lots ranging from 100 to 500 or 600 tons. There has been a fair number of such orders, totaling several thousand tons. Eastern Pennsylvania furnaces are in a comfortable position as to orders on their books, being sold up well into November, and it is expected that the demands of foundries that have not covered their requirements to the end of the year will take all of the iron that is not yet sold. Foreign iron is less of a factor than it was a few months ago, but there is still enough of it being offered at prices slightly less than those quoted on domestic iron to cause furnaces to be conservative about raising prices. To do so, it is believed, would merely invite more competition. The possibility of iron being brought into this district by water from Buffalo furnaces and the new furnace at Everett, Mass., as mentioned in a preceding paragraph, probably also will act as a deterrent to higher quotations on eastern Pennsylvania iron.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to $1.63 per gross ton:

| | |
|---|---|
| East. Pa. No. 2 plain, 1.75 to 2.25 sil. | $21.76 to $22.26 |
| East. Pa. No. 2X, 2.25 to 2.75 sil. | 22.26 to 22.76 |
| East. Pa. No. 1X | 22.76 to 23.26 |
| Virginia No. 2 plain, 1.75 to 2.25 sil. | 27.67 to 28.67 |
| Virginia No. 2X, 2.25 to 2.75 sil. | 28.17 to 29.17 |
| Basic delivered eastern Pa. | 20.75 to 21.50 |
| Gray forge | 21.00 to 22.00 |
| Malleable | 22.00 to 22.50 |
| Standard low phos. (f.o.b. furnace) | 22.00 to 23.00 |
| Copper bearing low phos. (f.o.b. furnace) | 23.50 to 24.00 |

**Ferromanganese.**—Prices are unchanged, ranging from $88 to $95, furnace, on domestic ferromanganese, with the price on the foreign alloy still too high to be a factor. Sales are small and infrequent.

**Billets.**—A locomotive company has bought 1200 tons of forging billets, and other sales within the week have brought the total up to 4000 or 5000 tons. An inquiry for 1000 tons is being quoted on. Some sales have been on the basis of $35, Pittsburgh, for rerolling billets and $40 for forging billets, but on the larger orders these prices have been shaded 50c. a ton.

**Plates.**—Several fourth quarter contracts for plates have been entered within the week by Eastern plate mills at 1.90c., Pittsburgh, and there is apparently no deviation from that price on current orders. Business has been in fairly good volume, and Eastern mills are maintaining about the same rate of operation as in recent weeks, ranging from 50 to 60 per cent.

**Structural Material.**—Eastern structural mills have full schedules, and in some instances are not able to promise early deliveries. When buyers want shipment within two or three weeks, they are sometimes asked to pay 2.10c., Pittsburgh, $2 a ton above the regular market price. About 5000 tons of fabricated steel for a power plant and bridge for the Susquehanna Power Co., at Conowingo, Md., will be furnished by the Fort Pitt Bridge Works.

**Bars.**—Specifications for steel bars against third quarter contracts are coming out a little more freely this month than in August. Some contracts for fourth quarter have been entered by the mills at 2c., Pittsburgh.

**Sheets.**—Not a great deal of tonnage in black and galvanized sheets has been entered since the adoption of the new bases of No. 24 gage, as many consumers anticipated their requirements the first of the month when the new extras went into effect. Some of the sheet mills have booked more tonnage than they expected to, and as a result are finding it difficult to meet the delivery requirements of a part of their regular trade. Deliveries on black and galvanized sheets of the lighter gages are difficult to obtain earlier than late October or early November. Although the new base prices and extras are being quoted on all new business, much of the sheet tonnage to be shipped during the next month or two will be at the prices most advantageous to the buyer, whether these apply on the old bases or the new. Blue annealed sheets are quoted usually at 2.30c., Pittsburgh, with occasional sales still being made at 2.25c.

**Warehouse Business.**—Sales of steel bars and structural shapes of foreign origin out of local warehouse stocks are upsetting the price situation to a greater extent than hitherto. Structural shapes are being offered as low as 2.60c., which is $3 to $6 a ton below warehouse quotations on domestic steel. Some of the warehouses have been forced to stock some foreign bars and shapes in order to bring their average costs down to a point where such competition can be met wholly or partially.

**Imports.**—Pig iron imports last week totaled only 1550 tons, of which 1000 tons came from Germany and the balance from the Netherlands. Structural steel from Belgium amounted to 60 tons. There were no other iron and steel imports in the week ended Saturday.

**Old Material.**—With consumer buying a less important factor in the scrap market, trading has been left in the hands of dealers and brokers. Prices have declined on nearly all grades. For heavy melting steel the highest offer by a mill today (Tuesday) was $17, delivered, and brokers were paying only $16.50 and $16.75 on steel scrap to apply on contracts for mills

### Warehouse Prices, f.o.b. Philadelphia

| | Base per Lb. |
|---|---|
| Tank steel plates, ¾-in. and heavier | 2.80c. to 3.00c. |
| Tank steel plates, ¼-in. | 3.00c. |
| Structural shapes | 2.75c. to 2.90c. |
| Soft steel bars, small shapes and iron bars (except bands) | 3.00c. |
| Round-edge iron | 3.50c. |
| Round-edge steel, iron finished, 1½ x 1½ in. | 3.50c. |
| Round-edge steel, planished | 4.30c. |
| Reinforcing steel bars, square, twisted and deformed | 3.00c. |
| Cold-finished steel, rounds and hexagons | 4.00c. |
| Cold-finished steel, squares and flats | 4.50c. |
| Steel hoops | 4.00c. to 4.25c. |
| Steel bands, No. 12 gage to ¼-in., inclusive | 3.75c. to 3.90c. |
| Spring steel | 5.00c. |
| No. 24 black sheets | 4.25c. |
| No. 10 blue annealed sheets | 3.40c. |
| No. 24 galvanized sheets | 5.20c. |
| Diamond pattern floor plates— ¼-in. | 5.30c. |
| ¼-in. | 5.50c. |
| Rails | 3.20c. |
| Tool steel | 8.50c. |
| Swedish iron bars | 6.00c. to 6.50c. |

other than Bethlehem Steel Co. at Bethlehem, Pa., and for that point $15.50 was being offered by brokers. The opinion prevails in the scrap trade that the decline is merely a temporary recession and will not go far. Prospects that the steel industry will continue to operate at a high rate over the remainder of the year indicate, in the opinion of the scrap trade, renewed buying activity within the near future.

We quote for delivery, consuming points in this district, as follows:

| | | |
|---|---|---|
| No. 1 heavy melting steel | | $17.00 |
| Scrap rails | | 17.00 |
| Steel rails for rolling | 17.50 to | 18.00 |
| No. 1 low phos., heavy, 0.04 per cent and under | 21.00 to | 22.00 |
| Couplers and knuckles | 19.00 to | 19.50 |
| Rolled steel wheels | 19.00 to | 19.50 |
| Cast iron carwheels | 17.50 to | 18.00 |
| No. 1 railroad wrought | 17.50 to | 18.00 |
| No. 1 forge fire | | 14.50 |
| Bundled sheets (for steel works) | 13.50 to | 14.00 |
| Mixed borings and turnings (for blast furnace) | 12.50 to | 13.50 |
| Machine shop turnings (for steel works) | 13.50 to | 14.00 |
| Machine shop turnings (for rolling mill) | 14.00 to | 14.50 |
| Heavy axle turnings (or equivalent) | 14.50 to | 15.50 |
| Cast borings (for steel works and rolling mill) | 14.00 to | 14.50 |
| Cast borings (for chemical plant) | 16.00 to | 17.00 |
| No. 1 cast | 18.00 to | 18.50 |
| Heavy breakable cast (for steel works) | 16.50 to | 17.00 |
| Railroad grate bars | 14.00 to | 14.50 |
| Stove plate (for steel works) | 14.00 to | 14.50 |
| Wrought iron and soft steel pipes and tubes (new specifications) | 15.50 to | 16.00 |
| Shafting | 22.00 to | 23.00 |
| Steel axles | 24.00 to | 25.00 |

# New York

## Pig Iron Buying Gains—Seek Fourth Quarter Steel Contracts

NEW YORK, Sept. 14.—Pig iron buying is gradually gathering momentum, although there are few open inquiries. Active solicitation, however, is bringing out numerous orders for deliveries over the remainder of the year and in a few cases through first quarter. On the whole, melters are buying conservatively, and while most individual purchases are relatively small, rarely exceeding 500 tons, the aggregate tonnage placed is surprisingly large. The market has not been entirely devoid of large orders, however. The Crane Co., Bridgeport, Conn., recently closed for 2500 tons of foundry and malleable, and Abendroth Brothers, Port Chester, N. Y., placed 1000 tons of foundry. The Moore Brothers Co., Elizabeth, N. J., has bought 300 tons of No. 1X foundry and 150 tons of Bessemer for fourth quarter. Sales in this district by local brokers during the past week totaled about 13,000 tons. There is probably an equal tonnage of iron pending in inquiries. One important melter is in the market for 3000 to 5000 tons, another for 1000 tons and a third for 500 to 1000 tons. As furnaces accumulate more comfortable backlogs, they are taking a firmer attitude on prices. While it cannot be said that the market has generally advanced, there is less of a tendency to make concessions to meet disadvantages in freight rates.

We quote per gross ton delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.54 from Virginia:

| | |
|---|---|
| East Pa. No. 2 fdy., sil. 1.75 to 2.25 | $21.89 to $23.01 |
| East Pa. No. 2X fdy., sil. 2.25 to 2.75 | 22.39 to 23.51 |
| East Pa. No. 1X fdy., sil. 2.75 to 3.25 | 22.89 to 24.02 |
| Buffalo fdy., sil. 1.75 to 2.25 (all rail) | 22.91 to 23.91 |
| No. 2 plain fdy., sil. 1.75 to 2.25 (by barge, del'd alongside in lighterage limits, N. Y. and Brooklyn) | 20.00 to 21.00 |
| No. 2 Virginia fdy., sil. 1.75 to 2.25 | 27.54 to 28.04 |

**Ferroalloys.**—Demand for only carloads and small lots of ferromanganese is reported. A sale of 30 tons of British ferromanganese is noted at $100, seaboard. Prices continue unchanged. The spiegeleisen market is quiet with the alloy somewhat scarce, both from domestic and foreign sources. It is understood that supplies of the 19 to 21 per cent alloy from American makers is hard to get, and the alloy usually available from British producers is practically shut off because of the coal strike. Specifications on contract for ferromanganese, spiegeleisen, ferrosilicon and ferrochromium continue heavy.

**Reinforcing Bars.**—The New York Board of Transportation has recommended to the city engineer that he forbid the use of German and Belgian bars in the city's subway construction. Reasons given are that the additional expense to the city of sending inspectors to foreign mills offsets the saving gained by lower foreign prices and that Bessemer steel, which makes up the bulk of imported bars, is not so well adapted to subway construction as open-hearth steel made in this country. The Kalman Steel Co. will furnish 1500 tons of bars for the American Book Bindery Building, New York. A few jobs of more than 100 tons have been let in the

### Warehouse Prices, f.o.b. New York

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.34c. |
| Soft steel bars and small shapes | 3.24c. |
| Iron bars | 3.24c. |
| Iron bars, Swedish charcoal | 7.00c. to 7.25c. |
| Cold-finished steel shafting and screw stock— | |
| Rounds and hexagons | 4.00c. |
| Flats and squares | 4.50c. |
| Cold-rolled strip, soft and quarter hard | 6.25c. |
| Hoops | 4.40c. |
| Bands | 3.89c. |
| Blue annealed sheets (No. 10 gage) | 3.89c. |
| Long terne sheets (No. 28 gage) | 6.35c. |
| Standard tool steel | 12.00c. |
| Wire, black annealed | 4.50c. |
| Wire, galvanized annealed | 5.15c. |
| Tire steel, 1½ x ⅛ in. and larger | 3.30c. |
| Smooth finish, 1 to 2½ x ¼ in. and larger | 2.65c. |
| Open-hearth spring steel, bases | 4.50c. to 7.00c. |

| | Per Cent Off List |
|---|---|
| Machine bolts, cut thread | 40 and 10 |
| Carriage bolts, cut thread | 30 and 10 |
| Coach screws | 40 and 10 |

| Boiler Tubes— | Per 100 Ft. |
|---|---|
| Lap welded steel, 2-in. | $17.33 |
| Seamless steel, 2-in. | 20.24 |
| Charcoal iron, 2-in. | 35.00 |
| Charcoal iron, 4-in. | 67.00 |

*Discounts on Welded Pipe*

| Standard Steel— | Black | Galv. |
|---|---|---|
| ⅛-in. butt | 46 | 29 |
| ¼-in. butt | 51 | 37 |
| ⅜-in. butt | 53 | 39 |
| 2½-6-in. lap | 48 | 25 |
| 7 and 8-in. lap | 44 | 17 |
| 11 and 12-in. lap | 37 | 12 |
| Wrought Iron— | | |
| ⅛-in. butt | 4 | +19 |
| ¼-in. butt | 11 | + 9 |
| 1-1½-in. butt | 14 | + 6 |
| 2-in. lap | 5 | +14 |
| 3-6-in. lap | 11 | + 6 |
| 7-12-in. lap | 3 | +16 |

*Tin Plate* (14 x 20 in.)

| | Prime | Seconds |
|---|---|---|
| Coke, 100 lb. base box | $6.45 | $6.20 |
| Charcoal, per box— | A | AAA |
| IC | $9.70 | $12.10 |
| IX | 12.00 | 14.25 |
| IXX | 13.90 | 16.00 |

*Terne Plate* (14 x 20 in.)

| | |
|---|---|
| IC—20-lb. coating | $10.00 to $11.00 |
| IC—30-lb. coating | 12.00 to 13.00 |
| IC—40-lb. coating | 13.75 to 14.25 |

*Sheets, Box Annealed—Black, C. R. One Pass*

| | Per Lb. |
|---|---|
| Nos. 18 to 20 | 4.15c. |
| No. 22 | 4.30c. |
| No. 24 | 4.35c. |
| No. 26 | 4.45c. |
| No. 28* | 4.60c. |
| No. 30 | 4.85c. |

*Sheets, Galvanized*

| | Per Lb. |
|---|---|
| No. 14 | 4.50c. to 4.75c. |
| No. 16 | 4.60c. to 4.85c. |
| No. 18 | 4.75c. |
| No. 20 | 4.90c. |
| No. 22 | 4.95c. |
| No. 24 | 5.10c. |
| No. 26 | 5.35c. |
| No. 28* | 5.60c. |
| No. 30 | 6.00c. |

*No. 28 and lighter, 24 in. wide, 10c. higher per 100 lb.

past week, but most of the tonnages continue to be small. Plans are ready for the Kymson Building, New York, which will take 2000 tons of bars, but the general contract has not been let. An attempt on the part of some of the larger companies to hold the mill price at 2.10c., base Pittsburgh, on smaller tonnages has given the market a firmer tone, and 2c. is being quoted only on large orders. The New York warehouse price is steady at 3.15c., delivered at job.

**Finished Steel.**—Orders for finished steel received by local selling offices thus far in September indicate that the month's business will approximate that of August. Some interest is being taken by consumers in fourth quarter requirements. A number of contracts for plates for that period have been closed during the week, all at 1.90c., Pittsburgh, and steel companies' offices are now negotiating with customers for bars, shapes and other products. So far as wants have been indicated, the consumption of nearly all grades of steel, excepting possibly tin plate, will be fully equal to or in excess of that used in the third quarter. Prospects are that finished steel prices will be unchanged, except, of course, on sheets, on which the new base prices and extras are now applying. Some sheet mills have taken business for fourth quarter in black and galvanized at the base prices of 3c., Pittsburgh, for No. 24 black and 3.85c. for No. 24 galvanized; a few mills have not opened their books but will probably do so this week. At least one mill is naming 3.10c. on black and 3.90c. on galvanized. There has been a falling off in structural steel work in the New York district, and a decline in the volume of building permits issued in August may indicate a further drop. August's permits in the greater city totaled close to $76,000,000 as compared with about $80,000,000 in July and $97,000,000 in August, 1925. The falling off is more marked in New York than in other leading cities of the country. The only item of importance in railroad equipment buying is the placing of orders by the New York Central for 124 items of passenger equipment.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.34c. per lb.; plates, 2.24c.; structural shapes, 2.34c.; bar iron, 2.24c.

**Warehouse Business.**—Buying from stock is in moderate volume, and prices continue firm. The new basis for quoting black and galvanized sheets is evidently satisfactory to the consumers, but purchasing is light. Jobbers carrying blue annealed sheets report a fair volume of sales last week. The quotation on Swedish charcoal iron bars out of stock is still 7c. to 7.25c. per lb., but a revision of prices is expected in the next few weeks. Although there is no noticeable increase in sales of reinforcing bars, jobbers report a slightly firmer market, reflected in smaller concessions from the warehouse price than were the rule recently.

**Cast Iron Pipe.**—The greater part of current business is still confined to purchases by private companies. An outstanding municipal tonnage, not yet awarded, is the 5000 to 6000 tons of 36-in. water pipe for Syracuse, N. Y., on which the United States Cast Iron Pipe & Foundry Co. was low bidder. The 10,000 tons of pipe for New York, on which a German company was low bidder for most of the items, has not yet been awarded. An inquiry for export to South America calls for about 62 miles of 24-in. to 30-in. water pipe. Bids are also reported to have been asked for the same mileage of steel pipe. While the market price for small lots continues firm, the larger tonnages, both public and private, bring out quotations of less than $50 per ton, delivered.

We quote pressure pipe per net ton, f.o.b. New York in carload lots, as follows: 6-in. and larger, $49.60 to $52.60; 4-in. and 5-in., $54.60 to $57.60; 3-in., $64.60 to $67.60; with $5 additional for Class A and gas pipe.

**Coke.**—Following a brief upward turn of the furnace coke market last week, as a result of the Labor Day suspension of ovens and the sudden activity of a large user in purchasing prompt shipment tonnages, the market has dropped back to $3.25 to $3.50 per ton, Connellsville. A recent export order closed in this district was for about 2500 tons for shipment to Chile. Standard foundry coke continues quiet, with quotations ranging from $4 to $5 per net ton, Connellsville. Delivered prices of standard foundry are $7.91 to $8.91, Newark and Jersey City, N. J.; $8.03 to $9.03, northern New Jersey, and $8.79 to $9.79, New York or Brooklyn. By-product foundry coke continues at $9.59 to $10.77, delivered Newark or Jersey City.

**Old Material.**—With Labor Day and the two Jewish holidays on Thursday and Friday, last week was quiet, business activity being almost entirely confined to part of Tuesday and Wednesday. Buying prices of heavy melting steel are unchanged at $15.50 to $17 per ton, delivered eastern Pennsylvania. Although there is evidently no excess tonnage of scrap coming out from yards, eastern Pennsylvania mills are reported more rigid than usual in their inspections. Most brokers are still paying up to $14 per ton, delivered, for machine shop turnings, but in a few instances, the buying price has been reduced to $13 per ton, Phoenixville, Pa., based on the recently announced price of $13.50 per ton by a consumer at that point. Local consumers of foundry stove plate are receiving shipments at $14.25 per ton, delivered.

Buying prices per gross ton, New York, follow:

| | |
|---|---|
| Heavy melting steel (yard) | $11.00 to $11.50 |
| Heavy melting steel (railroad or equivalent) | 12.85 to 13.50 |
| Rails for rolling | 14.00 to 14.25 |
| Steel car axles | 20.75 to 21.25 |
| Iron car axles | 24.50 to 25.25 |
| No. 1 railroad wrought | 14.75 to 15.25 |
| Forge fire | 10.50 to 11.00 |
| No. 1 yard wrought, long | 13.75 to 14.25 |
| Cast borings (steel mill) | 10.50 to 11.00 |
| Cast borings (chemical) | 13.50 to 14.00 |
| Machine shop turnings | 9.50 to 10.50 |
| Mixed borings and turnings | 10.00 to 10.50 |
| Iron and steel pipe (1 in. diam., not under 2 ft. long) | 12.25 |
| Stove plate (steel mill) | 10.50 to 11.00 |
| Stove plate (foundry) | 11.75 to 12.25 |
| Locomotive grate bars | 11.00 to 11.50 |
| Malleable cast (railroad) | 16.00 to 16.50 |
| Cast iron carwheels | 13.50 to 14.00 |
| No. 1 heavy breakable cast | 13.00 to 14.00 |

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

| | |
|---|---|
| No. 1 machinery cast | $16.50 to $17.00 |
| No. 1 heavy cast (columns, building materials, etc.), cupola size | 15.00 to 15.50 |
| No. 2 cast (radiators, cast boilers, etc.) | 14.00 to 14.50 |

# Cleveland

## Heavy Steel Orders from Automobile Industry—Pig Iron Declines 50c.

CLEVELAND, Sept. 14.—The demand for finished steel, reflected largely in specifications, keeps up at the fairly heavy rate that it has maintained the past two months, and as yet there are no signs of a slowing down that some looked for in September. Orders are well distributed among the various consuming industries. While some fourth quarter business has been taken in steel bars, plates and structural material, few consumers are showing much interest in placing contracts and mills are also showing a lack of interest in tying up consumers with contracts. However, some of the sheet mills are soliciting their trade for contracts for last quarter but have not closed much business for that delivery, and there is considerable activity in contracts for wire products for the fourth quarter. With prices as well stabilized as they are at present, consumers of steel bars, plates and structural material do not see any particular advantage in making contracts for a full quarter.

Reports are to the effect that nearly all of the Michigan automobile plants are operating at about full capacity, and this production is expected to keep up

**Warehouse Prices, f.o.b. Cleveland**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.00c. |
| Mild steel bars | 3.00c. |
| Cold-finished rounds and hexagons | 3.90c. |
| Cold-finished flats and squares | 4.40c. |
| Hoops and bands | 3.65c. |
| No. 24 black sheets | 3.70c. |
| No. 10 blue annealed sheets | 3.15c. |
| No. 24 galvanized sheets | 4.55c. |
| No. 9 annealed wire, per 100 lb | $3.00 |
| No. 9 galvanized wire, per 100 lb | 3.45 |
| Common wire nails, base, per keg | 3.00 |

through October. Automobile manufacturers are ordering steel quite heavily for early requirements, but few have bought for the entire last quarter. The increased use of the lakes for shipping steel has made water transportation an increasingly important factor in the development of market conditions. This being particularly true of a large consuming point like Detroit.

Regular prices are being maintained at 2c., Pittsburgh, for steel bars and structural material and at 1.90c. for plates.

**Pig Iron.**—Orders continue to come out in good volume for the fourth quarter. During the heavy buying movement in the early summer many foundries covered only for the third quarter, and there are still some of these to come in the market for the last quarter. Sales by Cleveland interests aggregated 15,000 tons during the week. Cleveland foundry and malleable iron for local delivery, which has been wavering, is now being offered at $18.50, furnace, or 50c. a ton less than local producers have been holding to. This softening is due to the competition of Valley iron, which at $17.50 could be delivered in Cleveland at 25c. a ton lower than the price of Cleveland iron sold at $19 at furnace. Valley furnaces will have to go to $17.25 to meet the new price. There was considerable activity the past week in western Ohio and Indiana, where a Cleveland interest sold about 5000 tons, including three 1000-ton lots. On some, if not all, of this business $18, furnace, was shaded, but the seller has restored $18 as the price for outside shipment. One Lake producer is holding to $19, furnace, for shipment into western Ohio and Indiana, and its freight advantage does not overcome its higher price for shipment to many consuming points. In Michigan the ruling price is unchanged at $19.50, furnace. Some additional inquiries have come out for iron for the first quarter, including one from an Indiana melter for 6000 tons of malleable iron. One malleable foundry making automobile castings, which wanted to protect itself with pig iron against a contract for castings, has purchased 1000 tons of malleable iron for the first half at 50c. above the going market. However, producers do not feel that they could sell much iron at present for delivery into next year at an advance over current prices.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6.01 from Birmingham:

| | | |
|---|---|---|
| Basic Valley furnace | | $17.50 |
| N'th'n No. 2 fdy., sil. 1.75 to 2.25 | $19.00 to | 19.50 |
| Southern fdy., sil. 1.75 to 2.25 | | 27.01 |
| Malleable | 19.00 to | 19.50 |
| Ohio silvery, 8 per cent | | 30.52 |
| Standard low phos., Valley furnace | | 27.50 |

**Semi-Finished Steel.**—Considerable business in fourth quarter contracts has been taken by a local mill which recently opened its books for the fourth quarter at the current price of $36, Cleveland, for sheet bars and $35 for slabs and large billets. Specifications continue in good volume.

**Sheets.**—Most mills are quoting black and galvanized sheets on the new base, and it is expected that a few that are still adhering to the old base and differentials will be using the new schedule before the end of the month. While a moderate volume of business has been taken at the new base, the change has caused some hesitation among buyers, who are waiting until they become more familiar with the new price arrangement. A number of inquiries have come out for round lots, and increased activity is expected the latter part of the month. While there has not been a thorough test of the new prices, some doubt is expressed as to whether all mills will maintain the $2 differential on black sheets in special finishes above the 3c. base on common black sheets. Following the establishment of Nos. 18 to 20 gages as the base for automobile body sheets and a 4.25c. base price, a $4 a ton differential above the base price has been named for No. 24 gage, or 4.45c.

**Strip Steel.**—Orders are coming out in fair volume, and the market is well maintained at 3.50c., Cleveland. However, some carlot sales are being made at 3.60c. The demand for hot-rolled strip is moderate, and some of the mills are not filled up far ahead.

**Reinforcing Bars.**—New inquiry for round tonnages has fallen off, but small lots are still in fair demand. Soft steel bars are commonly quoted at 2c., Pittsburgh, and the market is not firm at this price. Some of the mills are taking a firmer stand on rail steel bars, which are commonly quoted at 1.80c., mill.

**Warehouse Business.**—Cleveland warehouses have placed in effect the new gage differentials on black and galvanized sheets. The new prices are based on the same margins above mill prices that formerly prevailed. Warehouse business is fairly heavy, and regular prices are being maintained.

**Iron Ore.**—Ore firms do not look for much more business this season, although there will probably be some buying in small lots. One producer sold a 5000-ton lot of manganiferous ore the past week. There were 5,894,078 tons of ore on Lake Erie docks Sept. 1, as compared with 6,333,420 tons on the same date last year. The dock balance Sept. 1 was only 400,000 tons larger than on April 1, which indicates that practically all the ore is being shipped direct to furnaces. Ore receipts at Lake Erie docks during August were 7,655,470 tons, and for the season to Sept 1, 24,639,858 tons, as compared with 24,660,329 tons up to Sept 1 last year. Shipments from these docks during the month were 5,155,753 tons, and for the season until Sept 1, 18,765,056 tons, as compared with 18,055,199 tons up to Sept. 1 last year.

**Fluorspar.**—A price of $18 for gravel fluorspar is being adhered to by sellers in this territory, and three orders, aggregating 250 tons, were taken during the week at that price for delivery in the Pittsburgh and Buffalo territories. A small lot of No. 2 lump brought the regular price of $20.

**Coke.**—The market is firmer on Connellsville furnace coke, and a few producers have advanced prices. The price range is unchanged at $4.25 to $5, ovens. Connellsville furnace coke for foundry heating purposes ranges from $3.25 to $3.50, ovens. Ohio by-product coke is unchanged at $7.50, ovens, for September shipment.

**Bolts, Nuts and Rivets.**—Bolt and nut makers have reaffirmed present discounts for the fourth quarter except on stove bolts, which are advanced 5 per cent. On these, local makers are falling in line with the advance made recently by Chicago district makers. Bolt makers have also opened their books for small rivets for the fourth quarter at 70 and 10 per cent off list, or present regular prices. Rivet manufacturers have not yet announced fourth quarter prices, but will probably reaffirm present prices both on large and small rivets.

**Old Material.**—The local market is dull and weak, with prices 25c. a ton lower than a week ago on heavy melting steel and blast furnace grades. It is stated that only three local dealers have short orders, and with no new demand from the mills they can buy scrap at prices lower than prevailed recently. A local dealer bought heavy melting steel during the week at $15.25, as compared with the prevailing price of $15.75 a week ago. A Valley district mill that recently paid $18 for heavy melting steel is reported to have turned down an offer of 10,000 tons at $17.50.

We quote per gross ton delivered consumers' yards in Cleveland:

| | |
|---|---|
| Heavy melting steel | $15.25 to $15.75 |
| Rails for rolling | 16.25 to 16.50 |
| Rails under 3 ft | 18.00 to 18.50 |
| Low phosphorus billet, bloom and slab crops | 19.00 to 19.50 |
| Low phosphorus sheet bar crops | 18.50 to 19.00 |
| Low phosphorus plate scrap | 18.50 to 19.00 |
| Low phosphorus forging crops | 16.75 to 17.25 |
| Cast iron borings | 11.75 to 12.25 |
| Machine shop turnings | 11.00 to 11.50 |
| Mixed borings and short turnings | 11.75 to 12.00 |
| Compressed sheet steel | 14.00 to 14.25 |
| No. 1 railroad wrought | 11.50 to 12.00 |
| No. 2 railroad wrought | 15.50 to 15.75 |
| Railroad malleable | 18.00 to 18.50 |
| Light bundled sheet stampings | 12.00 to 12.50 |
| Steel axle turnings | 13.50 to 14.00 |
| No. 1 cast | 16.50 to 17.00 |
| No. 1 busheling | 12.50 to 13.00 |
| No. 2 busheling | 11.75 to 12.25 |
| Drop forge flashings, 15 in. and under | 11.50 to 12.00 |
| Railroad grate bars | 12.50 to 13.00 |
| Stove plate | 12.50 to 13.00 |
| Pipes and flues | 10.00 to 10.50 |

# San Francisco

## Three New Piers Will Take 2800 Tons of Steel Bars—Holidays Retard Buying

SAN FRANCISCO, Sept. 11 (*By Air Mail*).—With two State holidays during the week—Labor Day and Admission Day—buying has been restricted and few inquiries of importance have developed. Prospective business, however, is fairly large in the amount of tonnage that will be required. Bids are expected to be called within the next fortnight on about 1500 to 2000 tons of reinforcing steel for two piers in San Francisco Bay for the State Board of Harbor Commissioners, and bids are now being taken for about 800 tons for a wharf at Berkeley for the Golden Gate Ferry Co. The Southern Pacific Co. is expected to let contracts during the coming week on part of its recent inquiry for five ferry boats, which originally called for a total of about 4000 tons of plates and shapes.

**Pig Iron.**—A local importer received a shipment of about 100 tons of special analysis foundry iron from England during the week. No fresh inquiries are known to have been issued, and there is little of importance pending. Quotations are unchanged.

| | |
|---|---|
| *Utah basic | $25.00 to $26.00 |
| *Utah foundry, sil. 2.75 to 3.25 | 25.00 to 26.00 |
| **English foundry, sil. 2.75 to 3.25. | 25.00 |
| **Indian foundry, sil. 2.75 to 3.25. | 25.00 |
| **German foundry, sil. 2.75 to 3.25. | 24.25 |
| **Dutch foundry, sil. 2.75 to 3.25 | 22.50 |
| **Belgium foundry, sil. 2.75 to 3.25 | 22.00 |

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

**Shapes.**—The 900 tons required for the Cathedral Apartments, San Francisco, has been taken by the Central Iron Works. Bids are expected to be called within a few weeks on about 500 tons for a community apartment on Lake Merritt in Oakland, Cal. Eastern mills continue to quote plain material at 2.35c., c.i.f. Coast ports.

**Plates.**—About 260 tons is required by the city of Santa Barbara, Cal., for a municipal pipe line, for which bids will be taken Sept. 15. This is the only fresh inquiry of importance that has come up for figures. The Southern California Edison Co., Los Angeles, which has taken preliminary bids on about 7000 tons for a pipe line at San Diego, Cal., is expected to ask for figures shortly on an additional tonnage for estimating purposes. Eastern mills quote plates at 2.30c. c.i.f. Coast ports.

**Bars.**—Aside from the 2800 tons for pier work mentioned above, little fresh inquiry has developed. Lettings of reinforcing bars during the week have called for less than 100-ton lots with one exception, namely, 160 tons for a hospital at San Mateo, Cal., taken by Badt, Falk & Co., San Francisco. Local jobbers quote domestic reinforcing steel at 2.50c. to 2.65c., base, per lb. in carload lots, and at 2.80c. to 3c., base, per lb. in less-than-carload lots.

**Cast Iron Pipe.**—The United States Cast Iron Pipe & Foundry Co. has taken 1430 tons of Class B cast iron pipe for the city of Dallas, Tex. Los Angeles County will open bids Sept. 20 on 234 tons of 2-in. to 8-in. Class B pipe. The city of San Diego, Cal., will receive tenders Sept. 16 on 555 tons of 4-in. and 12-in. Class B pipe, and on the same date the city of Santa Cruz, Cal., will take bids on 287 tons of 12-in. Class B pipe. Fisher & McCall have been awarded a general contract for 368 tons of 2, 4 and 6-in. Class B pipe for the city of Phoenix, Ariz. Gerrick & Gerrick, Seattle, Wash., have taken 120 tons for the North End Reservoir, Tacoma, Wash.

**Steel Pipe.**—The Grinnell Co. of the Pacific has taken about 224 tons of 4, 6 and 8-in. standard steel pipe for the city of San Bernardino, Cal. The original inquiry called for 418 tons of cast iron pipe.

**Warehouse Business.**—Local jobbers have revised their quotations on black and galvanized sheets to conform with the recent mill change in the base gages. These changes have resulted in local warehouse prices advancing 25c. per 100 lb. on No. 28 black sheets, and 15c. on No. 28 galvanized sheets. No. 24 black sheets are quoted at 5.65c., base, per lb., f.o.b. warehouse, and No. 24 galvanized sheets are 4.90c. General buying during the week has been slack because of the two holidays.

**Coke.**—No action has yet been taken by the Southern Pacific Co. on its recent inquiry for 400 tons of by-product coke. A local importer has a shipment en route from Germany and is quoting about $12 to $12.50 per net ton at incoming dock.

**Warehouse Prices, f.o.b. San Francisco**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.30c. |
| Mild steel bars and small angles | 3.30c. |
| Small channels and tees, ¾-in. to 2¾-in. | 3.90c. |
| Spring steel, ¾-in. and thicker | 7.00c. |
| No. 24 black sheets | 4.90c. |
| No. 28 black sheets | 5.15c. |
| No. 10 blue annealed sheets | 3.90c. |
| No. 24 galvanized sheets | 5.65c. |
| No. 28 galvanized sheets | 6.15c. |
| Common wire nails, base per keg | $3.75 |
| Cement coated nails, base per keg | 3.00 |

# Birmingham

## Cast Iron Pipe Declines to $39—Pig Iron Market at Standstill

BIRMINGHAM, Sept. 14.—The pig iron market is still in a deadlock. The furnaces, on the one hand, are waiting for the larger buyers to come into the market and the consumers, on the other hand, are waiting for reduction in prices. Meanwhile, the furnace interests are holding the market at $21 per ton, Birmingham, for No. 2 foundry, and sales are confined to small lots for immediate delivery. One blast furnace on foundry iron will be blown out at once, another will probably be put out in the next three weeks, while a third, on basic, will be blown in, making a net loss of one furnace for the month. The tonnage of surplus iron piled on the furnace yards, is still below normal, it is said. Moreover, one of the independent furnace companies is furnishing iron to one of the steel companies in the district. One of the larger consumers of iron, however, is outspoken in predicting that pig iron quotations will come down. The melt of foundries is well maintained except among manufacturers of soil pipe and fittings. The Gulf States Steel Co. will have its blast furnace ready for torch in the next few days. The Sloss-Sheffield Steel & Iron Co. is pushing work on its No. 4 furnace at North Birmingham.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

| | |
|---|---|
| No. 2 foundry, 1.75 to 2.25 sil | $21.00 |
| No. 1 foundry, 2.25 to 2.75 sil | 21.50 |
| Basic | 21.00 |
| Charcoal, warm blast | 30.00 |

**Rolled Steel.**—The Ensley rail mill cannot keep pace with demand. A tow down the Warrior River this week was minus rails for the reason that it was necessary to ship rails in other directions against urgent orders. The railroads are already sounding out the market for their 1927 requirements. Three railroad projects in Alabama are in prospect which will require rails, as well as other forms of steel. Plates, sheets, wire and nails are moving in good volume, while concrete bars are also in strong demand. A large tonnage of bridge work in the Lake Pontchartrain section looms up among the future structural requirements. Much structural steel is being used in local projects also. Prices are unchanged at 2.15c. to 2.25c., Birmingham, on structural steel, 2.05c. to 2.15c. on plates and 2.15c. to 2.25c. on bars.

**Cast Iron Pipe.**—Prices on pressure pipe are slightly weaker, and the volume of new business has declined. Ruling quotations are $39 to $40, Birmingham, on 6-in. and larger sizes. There is enough business on hand and in sight, however, to warrant the steady operation of shops through the remainder of the year. Production is the heaviest in the history of this district. No surplus pipe is on hand. Considerable tonnage is still

due on contracts taken in the extreme West and Northwest. Barge service has been arranged for on 500 tons of pipe which will be shipped to extreme Northwest during the month of October.

**Coke.**—With all by-product plants in the district running at capacity and with independent producers free from surplus stocks, shipping as rapidly as coke is manufactured, the market is in a strong position. Quotations on foundry coke still range from $5.50 to $6 per ton. Considerable coke is leaving this district, but local consumption is heavy. Few beehive ovens are in operation in this State, but prospects are favorable for steady operation of all by-product coke plants through the remainder of the year.

**Old Material.**—Demand is at a low ebb, the market is slow, and prices are weak. Heavy melting steel is practically at a standstill, since the larger consumers are not buying. Cast scrap is selling in small quantities, with some tonnage going to blast furnaces. Turnings and borings are quiet.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

| | |
|---|---|
| Cast iron borings, chemical | $15.00 to $16.00 |
| Heavy melting steel | 12.00 to 13.00 |
| Railroad wrought | 12.00 to 13.00 |
| Steel axles | 17.00 to 18.00 |
| Iron axles | 17.00 to 18.00 |
| Steel rails | 13.00 to 14.00 |
| No. 1 cast | 16.50 to 17.00 |
| Tramcar wheels | 16.00 to 17.00 |
| Carwheels | 16.00 to 16.50 |
| Stove plate | 14.00 to 14.50 |
| Machine shop turnings | 7.50 to 8.00 |
| Cast iron borings | 7.50 to 8.00 |
| Rails for rolling | 15.00 to 16.00 |

# St. Louis

## With Cooler Weather Foundry Melt Increases 15 Per Cent

ST. LOUIS, Sept. 14.—The principal sale of the week was 1500 tons of basic iron to a nearby melter for shipment during the next 30 days from the Granite City furnace. This and several inquiries, including one for 2500 to 3500 tons of foundry iron for fourth quarter from an upper Illinois melter, lead makers to believe that a buying movement is about to be started. The weather is cooler and foundry operations have been increased 15 to 20 per cent within the last few weeks.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices, $2.16 freight from Chicago, $4.42 from Birmingham, all rail, and 81c. average switching charge from Granite City:

| | |
|---|---|
| Northern fdy., sil. 1.75 to 2.25 | $23.16 |
| Northern malleable, sil. 1.75 to 2.25 | 23.16 |
| Basic | 23.16 |
| Southern fdy., sil. 1.75 to 2.25 | 24.42 to 25.42 |
| Granite City iron, sil. 1.75 to 2.25 | 22.81 to 23.31 |

**Coke.**—Both foundry and domestic grades of coke are in good demand and the Granite City ovens are fairly well booked on the former grade. Foundries are increasing operations, with a consequent expansion in demand for coke.

**Finished Iron and Steel.**—Railroads are preparing to place orders for their 1927 rail requirements but have issued no definite inquiries. Warehouse business is reported to be improving, with orders heaviest from the Oklahoma oil fields. Warehouses have changed the base gage on black and galvanized sheets in line with the recent action of mills. Reinforcing bar mills are busy on old orders, but no new business is reported.

**Old Material.**—The market is weaker, as is evidenced by lower prices offered for local railroad lists. Dealers are not so eager to speculate as they have been. Consumers are reported to be well supplied with material and are not inclined to buy anything except "bargains" until they get more orders for their own products. New railroad lists include: Chesapeake & Ohio, 9500 tons; Missouri Pacific, 6000 tons; Southern Railway, 5900 tons; Wabash, 3300 tons; Great Northern, 2500 tons; Texas & Pacific, 1350 tons; Mobile & Ohio, 500 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

| | |
|---|---|
| *Per Gross Ton* | |
| Iron rails | $12.00 to $12.50 |
| Rails for rolling | 16.75 to 17.25 |
| Steel rails less than 3 ft. | 16.75 to 17.25 |
| Relaying rails, 60 lb. and under | 20.50 to 23.50 |
| Relaying rails, 70 lb. and over | 26.50 to 29.00 |
| Cast iron carwheels | 15.25 to 15.75 |
| Heavy melting steel | 14.00 to 14.50 |
| Heavy shoveling steel | 14.00 to 14.50 |
| Frogs, switches and guards cut apart | 15.50 to 16.00 |
| Railroad springs | 17.50 to 18.00 |
| Heavy axle and tire turnings | 11.00 to 11.50 |
| No. 1 locomotive tires | 16.00 to 16.50 |
| *Per Net Ton* | |
| Steel angle bars | 13.00 to 13.50 |
| Steel car axles | 18.75 to 19.25 |
| Iron car axles | 31.00 to 31.50 |
| Wrought iron bars and transoms | 20.25 to 20.75 |
| No. 1 railroad wrought | 12.00 to 12.50 |
| No. 2 railroad wrought | 12.50 to 13.00 |
| Cast iron borings | 10.00 to 10.50 |
| No. 1 busheling | 10.75 to 11.25 |
| No. 1 railroad cast | 14.75 to 15.25 |
| No. 1 machinery cast | 17.00 to 17.50 |
| Railroad malleable | 13.25 to 13.75 |
| Machine shop turnings | 7.00 to 7.50 |
| Bundled sheets | 8.00 to 8.50 |

**Warehouse Prices, f.o.b. St. Louis**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.25c. |
| Bars, mild steel or iron | 3.15c. |
| Cold-finished rounds, shafting and screw stock | 3.75c. |
| No. 24 black sheets | 4.45c. |
| No. 10 blue annealed sheets | 3.60c. |
| No. 24 galvanized sheets | 5.25c. |
| Black corrugated sheets | 4.65c. |
| Galvanized corrugated sheets | 5.30c. |
| Structural rivets | 3.65c. |
| Boiler rivets | 3.85c. |
| | **Per Cent Off List** |
| Tank rivets, ⅞-in. and smaller | 70 |
| Machine bolts | 50 and 5 |
| Carriage bolts | 47½ |
| Lag screws | 55 and 5 |
| Hot-pressed nuts, square, blank or tapped, 3.25c. off per lb. | |
| Hot-pressed nuts, hexagons, blank or tapped, 3.75c. off per lb. | |

# Seattle

## Record Salmon Pack in Alaska—Swedish Bars Imported at Low Prices

SEATTLE, Sept. 10.—Business conditions in Seattle in every line of trade are active, especially in new building. Permits for August totaled more than $3,200,000, a monthly record. The salmon pack in Alaska is about over and this year will amount to more than 6,000,000 cases, also a record. The lumber trade is more active and exports are showing a steady increase.

The steel trade in August was better than in July, both in new orders and inquiry, and September so far is holding up to last month. Prices are firm and the trade here believes that a good fall and winter business is in prospect unless something occurs to weaken prices, which is not believed likely. The new base prices on black and galvanized sheets have been well received by the local trade. Eastern steel mills have advised their local sales managers to pass orders unless they can obtain regular mill prices.

The lower rate of 5c. per 100 lb. by water from Eastern tidewater points to Seattle, making the rate 25c. per 100 lb., is still being absorbed by the mills, but is causing some buyers to hold back orders in order to find out whether the rate reduction will not soon be passed on to the customer. It is stated that some of the tramp boats are naming 20c. from tidewater to Seattle and as low as 17½c. is reported to have been quoted in some cases.

**Pig Iron.**—There is not much new inquiry, but prices are firm. A sale of 250 tons of No. 2 foundry grade is reported at about $25 per gross ton delivered, Seattle. We quote Utah basic and No. 2 foundry at $25 to $26 delivered, Seattle.

**Structural Shapes.**—The market seems to be holding firm on the basis of 2.30c. per lb., Seattle, but not much new work is coming out. Bids are now being taken in Chicago on about 400 tons of shapes and 25 tons column slabs for the local Orpheum theater, work on which

**Warehouse Prices, f.o.b. Seattle**

| | Base per Lb. |
|---|---|
| Structural shapes | 3.35c. |
| Steel bars | 3.35c. |
| Plates, tank | 3.25c. |
| Hoops | 4.50c. |
| Bands | 4.25c. |
| Reinforcing bars | 3.00c. |
| Machine steel | 3.75c. |
| Common wire nails, base per keg | $3.50 |
| Cement coated nails, base per keg | 3.00 |
| Rivets, tank | 50 per cent off list |
| Rivets, button head, base per 100 lb | $5.00 |
| Rivets, cone head, base per 100 lb | 5.20 |
| Bolts, carriage, all sizes | 40 per cent off list |

will start in a short time. We quote beams and channels at 2.35c., Seattle.

**Plates.**—Demand is light. The city of Yakima, Wash., plans to replace its present wooden water lines with steel and, if the program goes through, from 4000 to 5000 tons of plates will be required. Bellingham, Wash., has a similar program, while Seattle will be in the market shortly for about 2000 tons of plates for new water lines to replace present wooden lines that are about worn out. We quote tank plates at 2.30c. per lb., delivered Seattle, but this price is being shaded in some cases at least $1 per ton.

**Steel Bars.**—The local market on steel bars is being disturbed by importations of Swedish bars, which have been laid down here, but more especially at Portland, Ore., at as low as 1.74c., delivered, all carrying charges prepaid. Local sellers of bars are quoting 2.30c., delivered, but this price is not any too strong.

**Sheets.**—Practically all of the Eastern mills have adopted the new bases on black and galvanized sheets and two local jobbers have also done so.

**Wire Products.**—Demand for cement coated nails for cases for the fish pack has been active for some time and this year was the largest ever known. Demand for common wire nails is fairly active, but for wire is quiet. The quantity of wire nails and wire coming into this market from Eastern mills is diminishing, because of more favorable freight rates and quicker deliveries from the coast maker, as well as better service owing to closer proximity to the buyer. Wire nails are quoted at $3.20, base, per keg in carloads of 80,000 lb., delivered Seattle.

**Old Material.**—The local market is very dull and, due to the fact that exports of scrap to the Orient have practically stopped, prices are from $2 to $3 per ton lower. We now quote heavy melting steel at $11 per gross ton, miscellaneous scrap at $9 per gross ton and cast iron scrap at $15 per net ton, delivered to consumers. The supply of scrap is very heavy and, with little or no demand, prices seem likely to go lower.

# Boston

## Textile Machinery Business Gains—Pig Iron Imports for 1926 Decline

BOSTON, Sept. 14.—The Sullivan Machinery Co., Clairmont, N. H., is inquiring for 300 tons of 1.50 to 2 per cent foundry, and the Framingham Foundries, Framingham, Mass., is in the market for 350 tons of No. 1X and 150 tons of No. 2X. In both instances fourth quarter delivery is called for. Otherwise there is no open inquiry for pig iron, and sales the past week were limited to scattered lots, aggregating less than 5000 tons, with Buffalo and western Pennsylvania furnaces taking the bulk of the business for the first time in many months. Some of the iron sold is for deliveries running into 1927. Foundries are reported to be feeling out the market, but it is difficult to ascertain whether they really intend to buy. German iron is offered at $20.50 on dock duty paid, but domestic irons are quoted on a basis of $19, Buffalo, $20, eastern New York State furnace, and $20.50, Everett, for No. 2 plain foundry. It is now reported a Westfield, Mass., foundry recently bought close to 12,000 tons of No. 2 plain iron from two New York State furnaces at a price equivalent to $18, Buffalo. The textile machinery business, for the first time in months, is improving. The Saco-Lowell Shops have taken a $150,000 order from Japanese mill interests. Foundry supply houses report August the biggest month experienced in a long period.

**Warehouse Prices, f.o.b. Boston**

| | Base per Lb. |
|---|---|
| Soft steel bars and small shapes | 3.265c. |
| Flats, hot rolled | 4.15c. |
| Reinforcing bars | 3.265c. to 3.54c. |
| Iron bars— | |
| Refined | 3.265c. |
| Best refined | 4.60c. |
| Norway, rounds | 6.60c. |
| Norway, squares and flats | 7.10c. |
| Structural shapes— | |
| Angles and beams | 3.365c. |
| Tees | 3.365c. |
| Zees | 3.465c. |
| Plates | 3.365c. |
| Spring steel— | |
| Open-hearth | 5.00c. to 10.00c. |
| Crucible | 12.00c. |
| Tire steel | 4.50c. to 4.75c. |
| Bands | 4.015c. to 5.00c. |
| Hoop steel | 5.50c. to 6.00c. |
| Cold-rolled steel— | |
| Rounds and hexagons | 3.95c. |
| Squares and flats | 4.45c. |
| Toe calk steel | 6.00c. |

We quote delivered prices on the basis of the latest sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

| | |
|---|---|
| East. Penn., sil. 1.75 to 2.25 | $24.15 to $24.65 |
| East. Penn. sil. 2.25 to 2.75 | 24.65 to 25.15 |
| Buffalo, sil. 1.75 to 2.25 | 22.91 to 23.91 |
| Buffalo, sil. 2.25 to 2.75 | 23.41 to 24.41 |
| Virginia, sil. 1.75 to 2.25 | 27.92 to 28.42 |
| Virginia, sil. 2.25 to 2.75 | 28.42 to 28.92 |
| Alabama, sil. 1.75 to 2.25 | 30.60 |
| Alabama, sil. 2.25 to 2.75 | 31.10 |

**Cast Iron Pipe.**—The Bay State Dredging Co. was the low bidder on Section 5 of the South Essex, Mass., sewerage project, and the General Contracting Co., Boston, was low bidder on Section 6. These companies will soon buy a total of 6000 to 7000 tons of pipe. Current activity in the pipe market is confined mainly to private sales, which, in the aggregate, cover considerable tonnage, some of which is gas pipe. Prices quoted on domestic pipe in the open market are: 4-in., $60.10 per net ton, delivered common Boston freight rate points; 6 to 12-in., $55.10 to $56.10; larger pipe, $54.10 to $55.10. The usual $5 differential is asked for Class A and gas pipe.

**Coke.**—Both the New England Coal & Coke Co. and the Providence Gas Co. report a fairly sizable increase in specifications against last-half contracts for by-product foundry coke at $12 per net ton, delivered within a freight rate zone of $3.10. Foundries have not begun to stock up for the winter, however, and specifications are confined to current needs. Connellsville foundry coke is still available at 50c. to $1 a ton, delivered, under local fuel, but there is little demand for it. New England coke makers also have experienced an appreciable increase in the demand for domestic fuel.

**Old Material.**—Owing to the Jewish holidays last week business in old material dropped to a minimum. Most of the small amount of business transacted was confined to heavy melting steel, steel turnings, skeleton, forged scrap, scrap rails and a little specification pipe, which moved at unchanged prices. There is a good demand for cotton ties, but supplies are limited, and some dealers have orders for shafting.

The following prices are for gross-ton lots delivered consuming points:

| | |
|---|---|
| Textile cast | $18.50 to $19.00 |
| No. 1 machinery cast | 18.00 to 18.50 |
| No. 2 machinery cast | 16.00 to 16.50 |
| Stove plate | 13.00 to 13.50 |
| Railroad malleable | 19.50 to 20.00 |

The following prices are offered per gross-ton lots, f.o.b. Boston rate shipping points:

| | |
|---|---|
| No. 1 heavy melting steel | $12.00 to $12.50 |
| No. 1 railroad wrought | 12.50 to 13.00 |
| No. 1 yard wrought | 11.25 to 11.50 |
| Wrought pipe (1 in. in diameter, over 2 ft. long) | 11.00 to 11.25 |
| Machine shop turnings | 8.75 to 9.00 |
| Cast iron borings, chemical | 11.00 to 11.50 |
| Cast iron borings, rolling mill | 9.00 to 9.50 |
| Blast furnace borings and turnings | 8.00 to 8.50 |
| Forged scrap | 9.50 to 10.00 |
| Bundled skeleton, long | 9.50 to 10.00 |
| Forged flashings | 9.50 to 10.00 |
| Bundled cotton ties, long | 8.50 to 9.00 |
| Bundled cotton ties, short | 9.50 to 10.00 |
| Shafting | 16.50 to 17.00 |
| Street car axles | 16.00 to 17.00 |
| Rails for rerolling | 12.50 to 13.00 |
| Scrap rails | 11.75 to 12.25 |

**Imports.**—Importations of pig iron in August aggregated 6347 tons, made up of 995 tons of Indian and 5352 tons of Continental iron. Imports in July, this year, were 2423 tons, and in August, last year, 8248 tons. For the eight months ended with August imports totaled 49,547 tons, whereas for the corresponding period last year they were 66,708 tons. In August 26,232 tons of ore was received at this port, made up of 6075 tons of Algerian ore and 20,157 tons of Newfoundland ore. Imports of rails last month amounted to 12,133 tons.

# Buffalo

## Structural Steel Specifications Heavy—Pig Iron Market Quiet

BUFFALO, Sept. 14.—The market is very quiet, with few features. There are few inquiries, and none of them is large. One seller reports having received four inquiries of 200 to 300 tons each. Makers generally look for a quiet September and October, with a good run of business in November and December. Some buyers are sounding out the market on iron for first quarter, and it is understood that some furnaces would quote $20, base, on business in this district, for that delivery. The same producers are holding to $20, base, for current deliveries in this territory. There has been no further cut in operations. A maker with one stack down will probably bring it back into blast Nov. 1.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

| | | |
|---|---|---|
| No. 2 plain fdy., sil. 1.75 to 2.25 | $19.00 to | $20.00 |
| No. 2X foundry, sil. 2.25 to 2.75 | 19.50 to | 20.50 |
| No. 1X foundry, sil. 2.75 to 3.25 | 20.50 to | 21.50 |
| Malleable, sil. up to 2.25 | | 20.00 |
| Basic | | 19.00 |
| Lake Superior charcoal | | 29.28 |

**Old Material.**—Buying has tapered during the week, with little activity on the part of consuming interests. The only notable transaction was a purchase of heavy melting steel by a Depew, N. Y., interest at reported prices of $18 to $18.50, Depew. No. 1 cast is in better demand and is bringing $17 to $17.50. A large mill is offering $16 to $16.50 for the common grade of heavy melting steel. Stove plate is being sought at $15.75. Low phosphorus is firm at $18.50 to $19.

We quote prices per gross ton, f.o.b. Buffalo, as follows:

| | |
|---|---|
| Heavy melting steel | $16.00 to $16.50 |
| Selected No. 1 heavy melting steel | 18.00 to 18.50 |
| Low phosphorus | 18.50 to 19.00 |
| No. 1 railroad wrought | 15.00 to 15.50 |
| Carwheels | 17.00 to 17.50 |
| Machine shop turnings | 10.50 to 11.00 |
| Mixed borings and turnings | 12.00 to 12.50 |
| Cast iron borings | 12.00 to 13.00 |
| No. 1 busheling | 17.00 to 17.50 |
| Stove plate | 15.25 to 15.50 |
| Grate bars | 14.00 to 14.50 |
| Hand bundled sheets | 12.00 to 12.50 |
| Hydraulic compressed | 17.00 to 17.50 |
| No. 1 machinery cast | 16.00 to 16.25 |
| Railroad malleable | 16.50 to 17.00 |
| Iron axles | 24.00 to 25.00 |
| Steel axles | 16.00 to 16.50 |
| Drop forge flashings | 13.75 to 14.25 |

**Finished Iron and Steel.**—Structural steel is one of the most active products in the market this week, with specifications coming in unusually well and prices firm at 2.265c. per lb., Buffalo. Mills have taken a fair tonnage of plates, made up of a variety of small lots. Sheet business has been good at the new No. 24 gage base prices of 3c. to 3.10c., base Pittsburgh, for black and 3.85c. for galvanized. Jobbers are quoting No. 24 galvanized sheets at 5.15c., local warehouse, and No. 24 black sheets at 4.30c. There are new extras also on cement coated nails from warehouse. Mill operations range from 85 to 90 per cent. A fabricated structural job recently placed with a Buffalo shop amounted to 720 tons.

**Warehouse Prices, f.o.b. Buffalo**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.40c. |
| Mild steel bars | 3.30c. |
| Cold-finished shapes | 4.45c. |
| Rounds | 3.95c. |
| No. 24 black sheets | 4.30c. |
| No. 10 blue annealed sheets | 3.80c. |
| No. 24 galvanized sheets | 5.15c. |
| Common wire nails, base per keg | $3.90 |
| Black wire, base per 100 lb | 3.90 |

**Warehouse Prices, f.o.b. Cincinnati**

| | Base per Lb. |
|---|---|
| Plates and structural shapes | 3.40c. |
| Bars, mild steel or iron | 3.20c. to 3.30c. |
| Reinforcing bars | 3.20c. to 3.30c. |
| Hoops | 4.00c. to 4.25c. |
| Bands | 3.95c. |
| Cold-finished rounds and hexagons | 3.85c. |
| Squares | 4.35c. |
| Open-hearth spring steel | 4.75c. to 5.00c. |
| No. 24 black sheets | 4.05c. |
| No. 10 blue annealed sheets | 3.60c. |
| No. 24 galvanized sheets | 4.90c. |
| Structural rivets | 3.75c. |
| Small rivets | 65 per cent off list |
| No. 9 annealed wire, per 100 lb | $3.00 |
| Common wire nails, base per keg | 2.95 |
| Cement coated nails, base per 100-lb. keg | 3.15 |
| Chain, per 100 lb | 7.55 |
| | Net per 100 Ft. |
| Lap welded steel boiler tubes, 2-in. | $18.00 |
| 4-in. | 38.00 |
| Seamless steel boiler tubes, 2-in. | 19.00 |
| 4-in. | 39.00 |

# Cincinnati

## Foundries Stock Coke — Improved Demand for Galvanized Sheets for Roofing

CINCINNATI, Sept. 14.—Valley and Lake pig iron producers are still important factors in this market. While only approximately 5000 tons of pig iron was sold in the past week, most of the tonnage was taken by furnaces outside of southern Ohio. Ironton producers are firmly intrenched with comfortably filled order books, and their position has become even stronger recently as a result of production lost while furnaces were banked for repairs. Small lots of foundry iron have been disposed of at $20, base Ironton, and it is doubtful if even an attractive tonnage would bring out a price of $19.50. Jackson County silvery iron is firm at $27.50, furnace, for 8 per cent. A consumer in this territory has purchased 600 tons for delivery over the remainder of the year. Foundry iron from the Birmingham district is quoted at $21, base Birmingham, but iron from northern Alabama is reported to be available at $20.50. There has been no change in malleable grades, which are selling at $19 to $19.50, base furnace. The International Harvester Co. has bought 1500 tons of foundry iron for its Richmond, Ind., plant and 1000 tons of malleable for its Springfield, Ohio, works. An inquiry from the Muncie Malleable Iron Co., Muncie, Ind., for 6000 to 10,000 tons of malleable for delivery during the first half of 1927 has evoked much interest. The Louisville & Nashville is asking for 500 tons of foundry and 180 tons of charcoal iron.

Based on freight rates of $3.69 from Birmingham and $1.89 from Ironton, we quote f.o.b. Cincinnati:

| | |
|---|---|
| Alabama fdy., sil. 1.75 to 2.25 (base) | $24.19 to $24.69 |
| Alabama fdy., sil. 2.25 to 2.75 | 24.69 to 25.19 |
| Tennessee fdy., sil. 1.75 to 2.25 | 24.69 |
| Southern Ohio silvery, 8 per cent | 29.39 |
| So. Ohio fdy., sil. 1.75 to 2.25 | 21.39 to 21.89 |
| So. Ohio malleable | 20.89 |

**Finished Material.**—There has been a consistently good flow of specifications and orders from practically all consuming industries in the past week. While no large tonnages have been placed, the total volume of business booked is of liberal proportions. Consumers are still buying only for their immediate needs and are asking for prompt deliveries, but mills are not able to ship in less than four weeks. Prices have been well sustained in every commodity. The change from No. 28 to No. 24 gage as the base for quotations on black and galvanized sheets has stimulated sales and also has stabilized the market at 3c. and 3.85c., base Pittsburgh, respectively. The splendid weather prevailing recently has had a beneficial effect upon the roofing trade, which has ordered large tonnages of galvanized sheets. Blue annealed sheets are bringing 2.30c., base Pittsburgh. Demand for automobile body sheets at 4.30c., base

(*Concluded on page 823*)

# NON-FERROUS METAL MARKETS

The Week's Prices — Cents per Pound for Early Delivery

| | Sept. 14 | Sept. 13 | Sept. 11 | Sept. 10 | Sept. 9 | Sept. 8 |
|---|---|---|---|---|---|---|
| Lake copper, New York | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 |
| Electrolytic copper, N. Y.* | 14.07½ | 14.07½ | 14.05 | 14.05 | 14.05 | 14.05 |
| Straits tin, spot, New York | 68.87½ | 69.25 | .... | 68.12½ | 67.75 | 67.50 |
| Lead, New York | 8.75 | 8.75 | 8.90 | 8.90 | 8.90 | 8.90 |
| Lead, St. Louis | 8.50 | 8.50 | 8.60 | 8.60 | 8.60 | 8.60 |
| Zinc, New York | 7.82½ | 7.80 | 7.80 | 7.80 | 7.75 | 7.77½ |
| Zinc, St. Louis | 7.47½ | 7.45 | 7.45 | 7.45 | 7.40 | 7.42½ |

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Sept. 14.—The markets continue quiet, with quotations in most cases steady to firm. Favorable statistics in the copper and zinc markets have had little effect. Lead is quiet and a little lower, but tin has reached the highest price in several years.

**Copper.**—Favorable statistics for August have had almost no effect on the copper market. There was an increase in refined stocks of 1700 tons, but a decrease in blister copper of 17,000 tons, showing a large decrease in copper above ground. Despite this, the market has been exceedingly quiet with total sales in small volume, made in a majority of cases at 14.30c. to 14.32½c., delivered in the Valley. Some large producers are still asking 14.37½c. but the general market for electrolytic copper is quoted at 14.30c. to 14.37½c., delivered. Consumers must still buy considerable metal but evidently are in no hurry to do so. Lake copper is quoted at 14.50c., delivered.

**Tin.**—Yesterday Straits tin sold at 69.25c., New York, the highest price this year. Quotations have advanced almost daily in the past week, due largely to the fact that supplies in general are by no means ample. Sales for the week amounted to about 900 tons, with Thursday and Friday, Sept. 9 and 10, the most active days, when 300 tons was sold on each day. Consumers are anxious about both the price and the supply and are exercising caution before placing orders. They made some purchases for November-December delivery, but are not well covered for those positions and some must still buy for October. London dealers have bought here for September-October delivery. In general, the market has great strength with speculators largely inactive because of the peak prices. The market today was quiet with spot Straits quoted at 68.87½c., New York. In London quotations today were considerably higher than a week ago with spot standard quoted at £317 15s., future standard at £297 15s. and spot Straits at £315 15s. The Singapore price today was £307. Arrivals thus far this month have been 2315 tons, with 5945 tons reported afloat.

**Lead.**—The leading interest reduced its New York contract price yesterday from 8.90c. to 8.75c. Prices in the West are a little easier at 8.50c., St. Louis. The market is quiet and demand fairly good, and there are no features of interest.

**Zinc.**—Statistics for August reveal a decline in stocks of about 5000 tons and the market has been a little stronger as a result. Prime Western is quoted at 7.47½c. to 7.50c., St. Louis, or 7.82½c. to 7.85c., New York. Demand continues in fair volume, particularly from galvanizers.

**Nickel.**—Ingot nickel in wholesale lots is quoted at 35c. with shot nickel at 36c. per lb. Electrolytic nickel is quoted at 39c.

**Antimony.**—With political conditions in China scarcely improved, Chinese metal is a little firmer with spot delivery quoted at 16.25c. to 16.50c., New York, duty paid. Future shipments are held at 16.25c.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c. per lb., delivered.

### Non-Ferrous Metals at Chicago.

Sept. 14.—The demand for copper is steady and the price is unchanged. Tin and antimony are advanced under the influence of a substantial demand and lead is easier. The old metal market is quiet and quotations are the same as a week ago.

We quote, in carload lots, Lake copper, 14.60c.;

### Metals from New York Warehouse

*Delivered Prices per Lb.*

| | |
|---|---|
| Tin, Straits pig | 70.25c. to 71.00c. |
| Tin, bar | 72.00c. to 72.50c. |
| Copper, Lake | 15.50c. |
| Copper, electrolytic | 15.25c. |
| Copper, casting | 14.75c. |
| Zinc, slab | 8.50c. to 9.00c. |
| Lead, American pig | 9.25c. to 9.75c. |
| Lead, bar | 11.50c. to 12.50c. |
| Antimony, Asiatic | 18.00c. to 19.00c. |
| Aluminum, No. 1 ingot for remelting (guaranteed over 99 per cent pure) | 30.00c. to 30.50c. |
| Babbitt metal, commercial grade | 25.00c. to 35.00c. |
| Solder, ½ and ½ | 41.50c. to 42.50c. |

### Metals from Cleveland Warehouse

*Delivered Prices per Lb.*

| | |
|---|---|
| Tin, Straits pig | 72.50c. |
| Tin, bar | 75.50c. |
| Copper, Lake | 15.00c. |
| Copper, electrolytic | 15.00c. |
| Copper, casting | 14.00c. |
| Zinc, slab | 8.50c. |
| Lead, American pig | 9.75c. |
| Antimony, Asiatic | 20.50c. |
| Lead, bar | 11.50c. |
| Babbitt metal, medium grade | 22.50c. |
| Babbitt metal, high grade | 78.50c. |
| Solder, ½ and ½ | 43.50c. |

### Rolled Metals from New York or Cleveland Warehouse

*Delivered Prices, Base per Lb.*

| | |
|---|---|
| *Sheets—* | |
| High brass | 19.37½c. to 20.37½c. |
| Copper, hot rolled | 23.00c. to 24.00c. |
| Copper, cold rolled, 14 oz. and heavier, | 25.25c. to 26.25c. |
| *Seamless Tubes—* | |
| Brass | 24.25c. to 25.25c. |
| Copper | 25.00c. to 26.00c. |
| *Brazed Brass Tubes* | 27.37½c. to 28.37½c. |
| *Brass Rods* | 17.12½c. to 18.12½c. |

**From New York Warehouse**

*Delivered Prices, Base per Lb.*

| | |
|---|---|
| *Zinc sheets (No. 9), casks* | 13.00c. to 13.25c. |
| *Zinc sheets, open* | 13.50c. to 13.75c. |

## Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products, zinc sheets and lead full sheets have not changed for more than six weeks.

### List Prices Per Lb. f.o.b. Mill

*On Copper and Brass Products, Freight up to 75c. Per 100 Lb. Allowed on Shipments of 500 Lb. or Over*

| | |
|---|---|
| *Sheets—* | |
| High brass | 19.37½c. |
| Copper, hot rolled | 23.00c. |
| Zinc | 11.75c. |
| Lead (full sheets) | 12.50c. to 12.75c. |
| *Seamless Tubes—* | |
| High brass | 24.25c. |
| Copper | 25.00c. |
| *Rods—* | |
| High brass | 17.12½c. |
| Naval brass | 19.87½c. |
| *Wire—* | |
| Copper | 16.37½c. |
| High brass | 19.87½c. |
| *Copper in Rolls* | 21.87½c. |
| *Brazed Brass Tubing* | 27.37½c. |

**Aluminum Products in Ton Lots**

*The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.*

| | |
|---|---|
| Sheets, 0 to 10 gage, 3 to 30 in. wide | 37.50c. |
| Tubes, base | 48.00c. |
| Machine rods | 34.00c. |

**Rolled Metals, f.o.b. Chicago Warehouse**

*(Prices Cover Trucking to Customers' Doors in City Limits)*

| *Sheets*— | Base per Lb. |
|---|---|
| High brass | 19¾c. to 20¾c. |
| Copper, hot rolled | 23c. |
| Copper, cold rolled, 14 oz. and heavier | 25¼c. |
| Zinc | 12.25c. |
| Lead, wide | 11.25c. |
| *Seamless Tubes*— | |
| Brass | 24¼c. |
| Copper | 25c. |
| *Brazed Brass Tubes* | 27¾c. |
| *Brass Rods* | 17⅛c. |

tin, 69c.; lead, 8.70c.; zinc, 7.50c.; in less than carload lots, antimony, 17.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.75c.; red brass, 9.25c.; yellow brass, 8c.; lead pipe, 7.50c.; zinc, 5c.; pewter, No. 1, 35c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 17.75c.; all being dealers' prices for less than carload lots.

## More Orders for Scrap at Detroit

DETROIT, Sept. 14.—While there has been no change in the market on old material in this district, more orders are being accepted at present prices than a week ago.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

| | |
|---|---|
| Heavy melting and shoveling steel | $13.25 to $13.75 |
| Borings and short turnings | 9.50 to 10.00 |
| Long turnings | 9.25 to 9.75 |
| No. 1 machinery cast | 17.00 to 18.00 |
| Automobile cast | 20.50 to 21.50 |
| Hydraulic compressed | 12.50 to 13.00 |
| Stove plate | 13.50 to 14.50 |
| No. 1 busheling | 11.25 to 11.75 |
| Sheet clippings | 8.00 to 8.50 |
| Flashings | 10.75 to 11.25 |

## Cincinnati Iron and Steel Market

*(Concluded from page 821)*

Pittsburgh, is light. Sales of special grades of sheets have been particularly heavy this month. The bar market is moderately active at 2c., base Pittsburgh. Structural shapes remain firm at 2c., base Pittsburgh, and tank plates are selling at 1.90c., base Pittsburgh. Although only a few sizable structural jobs have come out in the past two weeks, fabricators expect a number of small lettings to be placed in the next 10 days. Fabricating plants in this territory have sufficient work to insure the continuance of operations on the present comfortable schedule during the next 30 days. The wire market is sluggish, but increased sales are looked for.

**Reinforcing Bars.**—While no important tonnages have been placed in the past week, there are a number of small jobs pending. E. Kahn & Son, Cincinnati, will take bids soon on material for two buildings.

**Coke.**—Anticipating a possible tightening of the coal market, which would be reflected in higher coke prices and a probable curtailment of coke supply, foundries are stocking material for the first time in months. The increased volume of specifications and orders is well distributed over both beehive and by-product grades. Prices have not been affected, but they are strong.

Based on freight rates of $2.14 from Ashland, Ky., $3.53 from Connellsville, and $2.59 from Wise County ovens and New River ovens, we quote f.o.b. Cincinnati: Connellsville foundry, $7.53 to $8.53; Wise County foundry, $7.09 to $7.59; New River foundry, $9.59 to $10.09; by-product foundry, $9.64.

**Old Metals, Per Pound, New York**

*The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.*

| | Dealers' Buying Prices | Dealers' Selling Prices |
|---|---|---|
| Copper, heavy crucible | 12.00c. | 13.50c. |
| Copper, heavy and wire | 11.75c. | 12.50c. |
| Copper, light and bottoms | 9.75c. | 11.25c. |
| Brass, heavy | 7.25c. | 9.00c. |
| Brass, light | 6.25c. | 8.00c. |
| Heavy machine composition | 8.75c. | 10.125c. |
| No. 1 yellow brass turnings | 8.50c. | 9.25c. |
| No. 1 red brass or composition turnings | 8.25c. | 9.25c. |
| Lead, heavy | 7.50c. | 8.00c. |
| Lead, tea | 5.75c. | 6.50c. |
| Zinc | 4.25c. | 4.75c. |
| Sheet aluminum | 17.00c. | 19.00c. |
| Cast aluminum | 17.00c. | 19.00c. |

**Old Material.**—While steel plants in this territory are operating on heavy schedules, it is not likely that they will be active buyers of scrap for 30 to 60 days. Despite the fact that the outlook is not so favorable as it was several weeks ago, prices are holding firm. Among the railroad lists closing this week are the following: Southern, 5000 tons; Norfolk & Western, 4400 tons; and Louisville & Nashville, 7000 tons.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

| *Per Gross Ton* | |
|---|---|
| Heavy melting steel | $14.00 to $14.50 |
| Scrap rails for melting | 13.50 to 14.00 |
| Short rails | 19.00 to 19.50 |
| Relaying rails | 27.00 to 27.50 |
| Rails for rolling | 15.00 to 15.50 |
| Old carwheels | 13.00 to 13.50 |
| No. 1 locomotive tires | 13.00 to 13.50 |
| Railroad malleable | 15.50 to 16.00 |
| Agricultural malleable | 14.50 to 15.00 |
| Loose sheet clippings | 8.50 to 9.00 |
| Champion bundled sheets | 10.00 to 10.50 |
| *Per Net Ton* | |
| Cast iron borings | 7.50 to 8.00 |
| Machine shop turnings | 7.00 to 7.50 |
| No. 1 machinery cast | 18.00 to 19.00 |
| No. 1 railroad cast | 15.00 to 15.50 |
| Iron axles | 21.00 to 21.50 |
| No. 1 railroad wrought | 10.50 to 11.00 |
| Pipes and flues | 9.00 to 9.50 |
| No. 1 busheling | 10.50 to 11.00 |
| Mixed busheling | 7.00 to 7.50 |
| Burnt cast | 8.00 to 8.50 |
| Stove plate | 10.50 to 11.00 |
| Brake shoes | 11.00 to 11.50 |

## Creates Supply of Skilled Labor

*(Concluded from page 768)*

period to permit students who are slow at learning to complete the prescribed course.

**Seventy-five Per Cent of Students Enrolled Still with Company**

The plant in which the apprentices are being trained is operated on the open shop plan. The management has found that there has been no resistance upon the part of the older workmen or of the foremen to the establishment of the course, or to the instruction or progress of the students. Records show that fully 75 per cent of the students enrolled since the course was first inaugurated are still with the company. After conducting the course for about two and one-half years, the company now has an average of one apprentice for every 30 mechanics in the shop. It is planned, however, to increase the number of apprentices to one for every 10 men in the shop, in order to insure an adequate supply of recruits to fill unavoidable losses in the ranks of skilled mechanics.

In undertaking the training of apprentices, the Pettibone Mulliken Co. recognized its obligation to contribute its share of skilled men to the industrial world. In its opinion, the ranks of skilled workers must be filled; in fact, increased, and an extremely unsatisfactory condition is created when manufacturers cannot see the problem from any viewpoint other than that of trying to attract skilled workers from other shops.

## PERSONAL

George H. Wadsworth, president and general manager of the Wadsworth Core Machine & Equipment Co., Akron, Ohio, has recently celebrated the 25th anniversary of his invention of the core making machine. His organization in 1911 of the company which bears his name for the improvement and development of core machines and core-room equipment came as a result of many years of experience in the machine shop. Born at Chester, England, in 1857, Mr. Wadsworth began his career as an apprenticed machinist in the Stafford Road Works of the Western Railway Co., Wolverhampton, England. Coming to the United States in 1880, he worked in a number of machine shops in Cleveland, now out of business, finally becoming machine shop foreman for the Walker Mfg. Co., Cleveland, maker of pulley molding machines and gear molding machines. Removing to Dayton, Ohio, he became associated with the Smith-Vaile Pump Co., the Buckeye Iron & Brass Co., and finally with the National Cash Register Co., for which he organized the first tool room. Later he became superintendent for the Avery Stamping Co., Cleveland, leaving it in 1894 to become plant superintendent for the Falls Rivet & Machinery Co., Cuyahoga Falls, Ohio. During his association with this company he recognized the need of a machine for the making of stock cores, which led to its invention by him in 1901. Mr. Wadsworth's picture may be found on page 779.

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W. B. Brookfield has resigned from the Halcomb Steel Co., Syracuse, N. Y.

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Robert P. Dolan, associated for a number of years with the Greenfield Tap & Die Corporation, Greenfield, Mass., has been made secretary of the Greenfield Chamber of Commerce.

—

Henry Jones, at one time with the Foster Machine Co., Westfield, Mass., for many years with the Universal Machine Co., Lowell, Mass., and now British manager for the latter concern, is in this country for several weeks' vacation.

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Clarence K. Prince, purchasing agent for the H. B. Smith Co., Westfield, Mass., has been made chairman of a committee which is supervising the construction of a new library in Westfield.

—

C. H. Johnson has been appointed engineer in the service department of the Timken Roller Bearing Co., Canton, Ohio. He will have direct charge of the installation of Timken bearings in automotive and industrial applications.

—

H. N. Curd, general manager of the Seattle office of the Pacific Car & Foundry Co., has been elected president of the Manufacturers Association of Seattle.

—

J. G. Miller of J. G. Miller & Co., Philadelphia, has been appointed exclusive agent for Mystic Iron Works, Boston, in the Philadelphia district.

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Merrill C. Morrow, formerly assistant to general manager merchandising department Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed assistant sales manager of that department. He entered the employ of the Westinghouse company in 1900 as an office boy, and since 1902 has been engaged in sales work. In his new position his headquarters will be at the company's Mansfield, Ohio, plant.

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Erwin R. Brigham, vice-president North American Car Corporation, has been elected president of the Palace Poultry Car Co., succeeding Frank G. Fox, one of the former owners of the latter company who have sold their holdings to interests controlling the North American Car Corporation. I. V. Edgerton remains as vice-president and general manager. N. M. Stott has been elected secretary and treasurer.

—

G. E. Edwards, for the past two years a vice-president of the Marshall & Huschart Machinery Co., Chicago, has resigned.

—

Paul J. Nutting, recently president and general manager of the Binney Casting Co., Toledo, Ohio, has joined the H. S. Lee Foundry & Machine Co., Plymouth, Mich.

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H. W. Dillon, formerly with Durant & Co., New York, has been made Philadelphia sales engineer for the Chicago Pneumatic Tool Co., New York.

—

P. Roberts Baker, manager of operations at the plant of the Lukens Steel Co., Coatesville, Pa., has been appointed assistant to the president, effective Sept. 13. A new position, that of general superintendent, has been filled by the appointment of William H. Warren, who has been general superintendent of the Trumbull Steel Co., Warren, Ohio, since 1922.

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John P. H. Perry, for the past seven years vice-president in charge of new business for the Turner Construction Co., at its main office, at 244 Madison Avenue, New York, will, on Oct. 1, be located in the Chicago office of the Turner Construction Co., at 6 North Michigan Avenue, as vice-president in charge of operations in the Western territory of that company. Mr. Perry has been with the Turner Construction Co. over 20 years, having entered its employ in May, 1906.

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Victor L. Jones, vice-president in charge of sales for the Union Iron Works, Los Angeles, was one of the principal speakers before the national meeting of manufacturers' sales experts at Montour Falls, N. Y., Sept. 6 and 7. He spoke on the progress of Southern California along manufacturing and industrial lines. Mr. Jones plans making an extended tour of the East, visiting the larger steel mills of the country, and later will devote some time to a study of recent developments in sales methods, handling of materials, costs, production and kindred subjects.

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John R. Blair has been appointed manager of sales, Pittsburgh Steel Products Co., a subsidiary of the Pittsburgh Steel Co., succeeding Charles F. Palmer, resigned.

—

President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, was 72 years old Saturday, Sept. 11, and celebrated the occasion by inviting a number of friends in the steel industry to a week-end party at his home on the Logan Road, north of Youngstown. He received telegrams of congratulation from friends throughout the country. Among those who enjoyed Mr. Campbell's hospitality were Eugene G. Grace, president Bethlehem Steel Corporation; John A. Topping, chairman Republic Iron & Steel Co.; E. Arthur S. Clarke, secretary American Iron & Steel Institute, and former president of the Lackawanna Steel Co., Buffalo; Arthur J. Singer, New York; W. G. and Samuel Mather, H. G. Dalton, John Chandler and Harry Coulby, all of Cleveland. The guests participated in a golf tournament on the greens of the Youngstown Country Club.

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Prof. A. W. Sapojnikoff, who is a member of the Institute of Engineers of Ways of Communication, Leningrad, Russia, is now on a tour of the United States making an industrial investigation for his Government. He was one of the delegates from Russia to the last meeting of the International Association for Testing Materials which was held in New York in 1912.

—

Leonard Peckitt, president Replogle Steel Co., returned recently from a trip to Great Britain.

—

H. E. Lewis, vice-president Bethlehem Steel Corporation, has returned from a trip to Great Britain.

## REINFORCING STEEL

### Awards 3450 Tons, Including 1500 Tons for New York Building—Inquiries 5100 Tons

Concrete reinforcing steel awards during the past week were rather light, totaling 3450 tons, of which 1500 tons was for a book bindery building in New York. Among inquiries totaling 5100 tons are two of fair size—2000 tons for a building in New York and 1500 to 2000 tons for piers at San Francisco. Awards follow:

BOSTON, 700 tons, section 3, Dorchester tunnel, to Concrete Steel Co.

NEW YORK, 1500 tons, American Book Bindery Building, to Kalman Steel Co.

BROOKLYN, 100 tons, coal pockets, Larkin Coal Co., to Concrete Steel Co.

BROOKLYN, 250 tons, Bible House, to Jones & Laughlin Steel Corporation.

WESTCHESTER COUNTY, 100 tons, road work, to Concrete Steel Co.

CHICAGO, 200 tons, spirals for the Central Mfg. district, to Kalman Steel Co.

SOUTH HAVEN, MICH., 300 tons, filtration plant, to Concrete Steel Co.

MILWAUKEE, 140 tons of rail steel, building for Froedert Grain & Malting Co., to Calumet Steel Co.

SAN MATEO, CAL., 160 tons, Mills Memorial Hospital, to Badt, Falk & Co., San Francisco.

#### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

CAMBRIDGE, MASS., 150 tons, Central Trust Co., bank and office building.

WESTCHESTER COUNTY, 150 tons, road work, Wrightway Construction Co., general contractor.

NEW YORK, 2000 tons, Kymson Building; Park & Shaffer, architects.

CHICAGO, 200 tons, building at 180 West Washington Street, Harland & Corse, architects.

BERKELEY, CAL., 800 tons, wharf for the Golden Gate Ferry Co.

SAN FRANCISCO, 1500 to 2000 tons, two piers in San Francisco Bay for the State Board of Harbor Commissioners.

## OBITUARY

VERNON F. PRENTICE, Worcester, Mass., one of the founders of the Prentice Bros. Co. of that city and for many years the head of the business, died at his home, Sept. 9, aged 87 years. He was born in Worcester Jan. 22, 1839, the son of Benjamin F. Prentice, and as a young man learned the machinist's trade. Soon after becoming a journeyman he formed a partnership with his brothers, Benjamin and Albert for the manufacture of engine lathes. Later radial drills were added to the line. In 1912 the business was merged with that of the F. E. Reed Co. of Worcester as the Reed-Prentice Co., and Mr. Prentice retired to devote the rest of his life to stock-raising on his suburban farm. He leaves one son, Harry V. Prentice, who formerly was superintendent of the Prentice Brothers' works.

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FRED R. BETTIS, a salesman in the St. Louis office of the Greenfield Tap & Die Corporation, Greenfield, Mass., died in Chicago, Sept. 7. He was 37 years old.

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M. CARLYLE JOHNSON, founder of the Carlyle Johnson Machine Co., Manchester, Conn., and inventor of the Johnson friction clutch, died Sept. 12 at his home in Hartford. He was born at Hinsdale, N. H., in 1844, and following service in the Civil War, apprenticed himself to the then newly organized Pratt & Whitney Co. Later he devoted himself exclusively to the development and invention of mechanical devices, in 1905 founding the company which bears his name largely for the manufacture of his own inventions.

## DUMPING OF GERMAN STEEL

### Report of Commission Coming Soon—No Foreign Steel for New York Subways

WASHINGTON, Sept. 14.—No report has been received by the Treasury Department from the commission appointed recently to investigate the charge that bonuses have been paid in Germany on steel exported to the United States and that therefore German steel products coming into this country are subject to additional duties under section 303 of the tariff act of 1922. There is much interest, however, in the statement cabled from Berlin yesterday to the effect that the commission on which William Coffin, American consul general at Berlin, and Charles L. Turrill, American customs attaché in London, represent this country, has finished its inquiry. Its conclusions will probably be reported this month. While it is a question whether German steel associations can be held to have paid export bounties, such as are covered in section 303 of the tariff act, information that has reached this country from foreign representatives of American steel manufacturers indicates that sales of German steel products have been made in the United States at prices which bring them under the provisions of the anti-dumping act.

In this connection stress has been put on the sale of 15,000 tons of steel rails and 5000 tons of tie plates made last spring by the Krupp plant at Rheinhausen, Germany, to the Boston & Maine Railroad. Several shipments on this contract have been received at Boston. The price was reported to figure back to several dollars a ton less than that charged by the Krupp works on rails sold to German roads.

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NEW YORK, Sept. 14.—The Municipal Board of Transportation announced yesterday that it could not allow the use of foreign fabricated steel on contracts for subway construction. In view of the cheapness of Belgian and French structural shapes, contractors had asked that they be authorized to employ it. About 400,000 tons of steel will be required in the subway work that will be done in the next two years. On behalf of the Board of Transportation it was stated that only domestic steel would be used in the subways "unless the cost was increased to a point where foreign competition would have to be considered as a matter of self-protection against unwarrantably high bids."

## No Change in Wage Rates for Sheet and Tin Mills

YOUNGSTOWN, Sept. 14.—Tonnage rates paid sheet and tin mill workers in midwestern plants subscribing to the sliding scale wage agreement of the Amalgamated Association of Iron, Steel and Tin Workers continue unchanged for the September-October period from the July-August rate, which is 33 per cent above base. The bi-monthly examination of sales sheets Tuesday at Warren showed an average selling price of $3.25 per 100 lb. of Nos. 26, 27 and 28 gage black sheets shipped during the 60 days ended Aug. 31. This is unchanged from the average two months before.

## New Plate Mill for Lukens Steel Co.

The Lukens Steel Co., Coatesville, Pa., is installing a new 84-in. tandem plate mill to replace an 84-in., three-high plate mill built in 1871. The roughing stand of the new mill will be two-high reversing and the finishing stand four-high reversing, both motor driven. Production in the new unit is scheduled to start early in 1927.

No. 6 blast furnace in the Ohio works group of the Carnegie Steel Co. will be blown in this week, following suspension all summer for rebuilding. As soon as this furnace is producing iron, No. 2 stack in this group will be suspended for repairs, keeping the active list in this group of furnaces at five out of six.

## FABRICATED STRUCTURAL STEEL

### Awards Total Close to 29,000 Tons, but Inquiries Fall Off in Volume

Structural steel awards of the week total nearly 29,000 tons, the largest of which is 5000 tons for a power plant and highway bridge at Conowingo, Md. Inquiries make a small total, less than 10,000 tons, among which the outstanding job in size is a municipal building for the city of Denver, requiring 2500 tons. Awards follow:

NEW YORK, 6433 tons in the following awards reported to the Structural Steel Board of Trade: St. Luke's Hospital, theater, 976-980 Third Avenue, and 17-story office building, Fifty-fourth Street and Fifth Avenue, to A. E. Norton, Inc.; apartment hotel, Fifth Avenue and Eighth Street, and addition to loft building, 248-250 West Thirtieth Street, to Hedden Iron Construction Co.; Parish House, Bleeker and Elizabeth Streets, to Harris Structural Steel Co.; pump house, Tidewater Oil Co.; Bayonne, N. J., office building, Brooklyn Union Gas Co., and public school, Newburgh, N. Y., to McClintic-Marshall Co.; office building, 9-15 Park Place, 5-story office building, Fifty-second Street and Fifth Avenue, and 3-story garage and store, Hempstead, L. I., to Levering & Garrigues Co.

NEW YORK, 100 tons, theater, McCombs Grove and West Tremont Avenue, to Hinkle Iron Co.

NEW YORK, 340 tons, 8-story office building, 149th Street and Cortland Avenue, to Kues Brothers.

NEW YORK, 150 tons, addition to Willard Parker Hospital, to Easton Structural Steel Co.

NEW YORK, 650 tons, service building, Purdie and Raymond Avenues, to Hinkle Iron Co.

NEW YORK, 245 tons, apartment, 137-139 East Twenty-eighth Street, to National Bridge Works.

NEW YORK, 1250 tons, hotel on West Twenty-third Street, to Easton Structural Steel Co.

NEW YORK, 1500 tons, loft building at Hudson and Varick Streets, to Jones & Laughlin Steel Corporation.

BRIDGEPORT, CONN., 650 tons, addition to Hotel Stratfield, to Jones & Laughlin Steel Corporation.

PHILADELPHIA, 135 tons, building for the American La France Fire Engine Co., to Belmont Iron Works.

STATE OF NEW JERSEY, 115 tons, highway bridge, to Phoenix Bridge Co.

ATLANTIC CITY, N. J., 775 tons, bank and arcade building, to Jones & Laughlin Steel Corporation.

PHILADELPHIA, 1250 tons, auditorium for University of Pennsylvania, to Jones & Laughlin Steel Corporation.

BILLERICA, MASS., 900 tons, repair shop for the Boston & Maine Railroad, to Jones & Laughlin Steel Corporation.

MOUNT VERNON, N. Y., 1700 tons, office building for Westchester Lighting Co., to Jones & Laughlin Steel Corporation.

BROOKLYN, 170 tons, theater, Myrtle and Wyckoff Avenues, to Hinkle Iron Co.

LAKE DENMARK, N. J., 400 tons, repairs to Government buildings, to Dover Boiler Works.

CHARLESTOWN, MASS., 290 tons, Wiggin Terminal warehouse, to New England Structural Co.

READING, MASS., 100 tons, high school, to New England Structural Co.

CONOWINGO, MD., 5000 tons, Susquehanna Power Co. power house and highway, to Fort Pitt Bridge Works.

BUFFALO, 720 tons, Manufacturers' & Traders' Bank, to R. S. McMannus Steel Corporation.

TROY, OHIO, 200 tons, for 500,000-gal. municipal water tank, to Pittsburgh-Des Moines Steel Co.

DETROIT, 350 tons, Chrysler Motor Car Co., plant extension, to Fort Pitt Bridge Works.

PAINESVILLE, OHIO, 130 tons, Fairport & Eastern Railway Co., to Kilroy Structural Steel Co.

CLEVELAND, 100 tons, crane runway, Westinghouse Electric & Mfg. Co., to Gulbert Steel Co.

PITTSBURGH, 250 tons, tow boat hull for Hillman Transportation Co., to American Bridge Co.

NEW ORLEANS, 1400 tons, Public Service Building, to McClintic-Marshall Co.

NEW ORLEANS, 600 tons, building, to Lukens Steel Co.

ROCHESTER, MINN., 425 tons, power plant for Mayo Clinic, to Pittsburgh-Des Moines Steel Co.

DES MOINES, IOWA, 190 tons, Grace Methodist Episcopal Church, to American Bridge Co.

GARY, IND., 200 tons, Gary Printing & Publishing Co., to American Bridge Co.

ROCKFORD, ILL., 325 tons, Orpheum Theater, to A. Woods & Co., Chicago.

DECATUR, ILL., 320 tons for Texas Co. at Casper, Wyo., Lockport, Ill., and Tulsa, Okla., to Mississippi Valley Structural Steel Co.

SAN FRANCISCO, 900 tons, Cathedral Apartments, California and Jones Streets, to Central Iron Works, San Francisco.

HONOLULU, 550 tons, building for Libby, McNeil & Libby, to Vierling Steel Works, Chicago.

#### Structural Projects Pending

Inquiries for fabricated steel work include the following:

PHILADELPHIA, 700 tons, junior high school, Sixteenth and Wharton Streets.

BALTIMORE, 100 tons, theater.

MANSFIELD, OHIO, 500 tons, Ohio Brass Co. office building.

BOSTON, 200 tons, bridge for the Park Commission.

CAMBRIDGE, MASS., 400 tons, Cambridge Trust Co., bank and office building.

FRAMINGHAM, MASS., 100 tons, town hall.

LEOMINSTER, MASS., 200 tons, school.

WEBSTER, MASS., 200 tons, school.

READING RAILROAD, 200 tons, grade crossing bridge.

HAVRE DE GRACE, MD., 1200 tons, additional roadway for highway bridge.

WOODBURY, L. I., 600 tons, St. Sebastian school.

NEW YORK CENTRAL RAILROAD, 300 tons, bridge repairs.

PENNSYLVANIA RAILROAD, 900 tons, catenary bridge for electrification of line between Philadelphia and Wilmington, Del.

GIBSONBURGH, OHIO, 800 tons, plant Gibsonburgh Lime Products Co.

DENVER, COLO., 2500 tons, municipal building.

OAKLAND, CAL., 500 tons, community apartment building on Lake Merritt.

DANVILLE, CAL., 100 tons, Danville Bridge, Herrick Iron Works, Oakland, low bidder.

SANTA BARBARA, CAL., 260 tons, pipe line for the city; bids Sept. 15.

## RAILROAD EQUIPMENT

### New York Central Buys 124 Passenger Cars—Other Business Light

No railroad business of importance has developed within the past week either in the form of orders or inquiries except the orders of the New York Central for 124 passenger, baggage and milk cars, which represent more in financial outlay than in steel tonnage. The items of the week follow:

The New York Central has distributed orders for 124 items of passenger equipment as follows: 30 coaches to Pullman Car & Mfg. Corporation; 25 baggage cars, 10 coaches and 5 baggage-mail cars to the American Car & Foundry Co.; 30 suburban coaches and 4 suburban passenger-baggage-mail cars to the Standard Steel Car Co.; 20 milk cars to the Merchants' Despatch Transportation Co.

Condon Brothers & Co. have given an order for 10 air-dump cars to the Koppel Industrial Car & Equipment Co.

The New York, New Haven & Hartford is in the market for 10 steel underframes for baggage cars.

The Union Pacific has issued an inquiry for 7 baggage-sleeper cars.

The Consolidation Coal Co. is asking for prices on 100 mine cars.

The Youngstown Sheet & Tube Co. has issued an inquiry for 100 mine cars.

The Sinclair Refining Co. has ordered 16 special-type coke cars from the Koppel Industrial Car & Equipment Co.

The Palace Poultry Car Co. is in the market for 200 all-steel live poultry cars for delivery prior to Dec. 1.

The Orange & Fredericksburg Railroad Co., P. O. Box 1435, Richmond, Va., is inquiring for a used standard gage locomotive, about 50 tons capacity, spot delivery.

The Chicago & North Western is in the market for 4 dining cars, and has placed 2 baggage dormitory cars with the American Car & Foundry Co.

# Machinery Markets and News of the Works

## TRADE IS QUIET

### Machine Tool Business Has Not Yet Shown Expected Fall Pick-up

### Delco Light Co. Buying for New Plant at Dayton, Ohio, and Its Requirements Will Be Large

EXPECTATIONS of an improvement in machine-tool business following the Labor Day holidays have not yet materialized. There was some buying of tools last week at the New Haven, Conn., exhibition held under the auspices of the American Society Mechanical Engineers. Many prospective buyers are said to be postponing purchases until they have inspected machines to be exhibited at the convention of the American Society for Steel Treating in Chicago, Sept. 20-24.

August business, as shown by reports to the National Machine Tool Builders' Association, from 59 of its members was about 5 per cent below that of July, but shipments fell off due to the interference of vacation periods, resulting in an increase in unfilled orders. Machine tool builders will enter upon the fourth quarter of the year with a fair volume or orders on their books and encouraging prospects.

The Delco Light Co., Dayton, Ohio, is one of the most active buyers. Seven automatic lathes were bought last week, added to nine purchased in the previous week. Within the next month or two it is expected that this company will purchase a large amount of equipment for its new plant. A Michigan automobile company bought 20 turret lathes from a Cleveland manufacturer.

There are signs of a revival of buying by automobile manufacturers, but business from that source recently has been only fair. Railroad buying has been light in the past week.

Announcement of plans for the expansion of the tin plate works of the American Sheet & Tin Plate Co., at Gary, Ind., indicates that the company may soon be in the market for machine shop equipment. So far only the heavy mill equipment has been inquired for.

## New York

NEW YORK, Sept. 14.

MACHINE tool buying is not brisk, but is going along in fair volume. The recovery which was expected to come after Labor Day has not yet materialized. It is believed that many prospective buyers will take advantage of the opportunity offered to inspect machines on exhibit at the convention of the American Society for Steel Treating in Chicago the week of Sept. 20. There was a large turnout and some buying of machines last week at the New Haven, Conn., exhibit conducted by the American Society of Mechanical Engineers.

The Delco Light Co., Dayton, Ohio, is one of the most active buyers, having closed for seven automatic lathes, in addition to nine bought the preceding week. The total tool requirements for the company's new plant will be considerable and more orders will probably be placed soon. Orders of the week included the following: Company at San Diego, Cal., 18-in. x 12-ft. engine lathe, 16-in. x 8-ft. engine lathe and a floor grinder; a Chicago company, two 21-in. used engine lathes; company at Westerly, R. I., two 16-in. geared-head lathes; Chicago company, 16-in. geared-head lathe; Fort Wayne, Ind., manufacturer, 16-in. geared-head lathe; a Fitchburg, Mass., saw manufacturer, 22-in. x 7-ft. vertical surface grinder; Detroit automobile company, jig borer; Detroit automobile company, vertical shaper; Chicago company, a vertical drill press; McKeesport, Pa., company, vertical drill press. The New York Central Railroad bought a 44-in. vertical boring and turning mill and a vertical drill press.

The Staten Island Edison Corporation, St. George, S. I., has authorized enlargements in its steam-operated electric generating plant at Livingston, with the installation of a 15,000 kw. turbo-generator and auxiliary equipment, estimated to cost about $1,300,000. The company is operated by the J. G. White Management Corporation, 43 Liberty Street, New York, which will be in charge of the project. Stock in amount of $1,224,000 will be issued to provide in part for the expansion. C. S. Banghart is vice-president and general manager.

Robert Jacob, operating a ship-building works on City Island Avenue, New York, has filed plans for a one-story addition, 86 x 176 ft., to cost $25,000. George F. Hollenweger, 57 Perth Avenue, New Rochelle, N. Y., is architect.

The Board of Education, Babylon, L. I., contemplates the installation of manual training equipment in its proposed three-story high school, to cost about $250,000, for which superstructure will soon begin. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Sinclair Refining Co., 45 Nassau Street, New York, has acquired property at Little Ferry, N. J., 300 x 575 ft., and plans the construction of a new oil storage and distributing plant, to cost in excess of $100,000 with equipment.

The Servel Corporation, 51 East Forty-second Street, New York, manufacturer of refrigerating equipment, has disposed of a note issue, a portion of the proceeds to be used for expansion. The Hercules Corporation, Evansville, Ind., a subsidiary, has begun the construction of an addition to cost in excess of $50,000.

H. L. Doherty & Co., 60 Wall Street, New York, operating electric light and power utilities, has acquired a controlling interest in the Lake Shore Power Co., Toledo, Ohio, and its subsidiaries. Extensions are planned, including additional transmission lines and equipment.

The Silver Coal Co., Inc., New York, has acquired property at the foot of 140th Street and the Harlem River and will establish a new coal storage and distributing plant. The installation will include hoisting, conveying and kindred equipment, loaders, etc. Headquarters will be located at this site.

The Mariand Refining Co., 11 Broadway, New York, is planning for the early development of oil properties in Canada, comprising the holdings of the Hudson Bay Co., totaling 2,750,000 acres, recently secured under lease. Equipment will be installed for drilling, storage and distribution. E. W. Mariand is president.

The Seaboard Terminal & Refrigeration Co., Jersey City, N. J., recently organized under State laws, is disposing of a bond issue of $3,000,000, the proceeds to be used for the erection of a new ice-manufacturing, refrigerating and cold storage plant. The project will be carried out in cooperation with the Erie Railroad Co. The company will lease a block of property from the railroad at Monmouth, Coles and Twelfth Streets. The cold storage plant will be ten stories, 200 x 400 ft., the upper six floors to be equipped

for such purpose. On adjoining site, the ice-manufacturing plant will be equipped for a daily capacity of 500 tons, and will be supplemented with a complete refrigerating plant. Plans for the project have been filed for the approval of the city. L. B. Patterson is president.

The Tide Water Oil Co., 11 Broadway, New York, has plans for extensions in its refinery plant at Constable Hook, Bayonne, N. J., including the installation of equipment for gasoline production, etc., to cost $230,000. A number of pumping plants will be built.

The Harrison Bolt & Nut Co., Second Street, Harrison, N. J., is said to be arranging an early call for bids for a two-story addition, 100 x 100 ft., to cost about $45,000. Joseph W. Baker, 111 North Fourth Street, is architect.

The Bakelite Corporation, 230 Grove Street, Bloomfield, N. J., manufacturer of rubber specialties, etc., has awarded a general contract to Joseph Jewkes & Sons, 676 Montgomery Street, Jersey City, N. J., for its two-story addition, 60 x 180 ft., to cost $50,000. Fred L. Smith, 21 East Fortieth Street, New York, is architect.

The Hanson-Van Winkle Co., Oliver and Chestnut Streets, Newark, N. J., manufacturer of generators, dynamos, electro plating apparatus, etc., has acquired the former plant of the Atha Steel Works, later the Titan Steel Works, at the foot of Chapel Street and Lister Avenue. The structures will be remodeled for early occupancy, primarily for heavy duty operations. A contract has been let to Fletcher-Thompson, Inc., Bridgeport, Conn., engineer, for the improvements. Van Winkle Todd is president, and Fred L. Hewitt, vice-president.

Charles C. Phelps, 473 Getty Avenue, Paterson, N. J., has been appointed to handle the Marley superheater in New York City and northern New Jersey. The superheater is made by the Power Plant Equipment Co., Kansas City, and is designed for use with horizontal return tubular boilers and other boilers of the fire tube type.

The Pioneer Equipment Corporation of America, Woolworth Building, New York, has been incorporated with capital stock of $10,000 to manufacture mechanical separators, reducing valves and other equipment. The company will arrange for the manufacture of its products on contract, but later arangements may be made for a plant of its own.

E. I. Van Doren, 206 Times Building, Troy, N. Y., has been appointed district sales agent for the Burke Electric Co., Erie, Pa., manufacturer of motors, generators and welding equipment.

The Bayonne Steel Ceiling Co., 219-225 West Nineteenth Street, New York, has purchased a square block at Long Island City, N. Y., and in the near future will erect a two-story warehouse on this property.

## Philadelphia

PHILADELPHIA, Sept. 13.

CONTRACT has been let by the Leeds & Northrup Co., 4901 Stenton Avenue, Philadelphia, manufacturer of pyrometers and other electrical measuring instruments, to William R. Dougherty, 1608 Sansom Street, for an addition to cost more than $50,000 with equipment.

The Board of Education, Philadelphia, is said to be planning the installation of a manual training department in its proposed five-story high school on Sixteenth Street to cost $650,000, for which bids have been asked on a general contract. Irwin T. Catherine, Nineteenth and Chestnut Streets, is architect.

The Hoffman-Henon Co., Finance Building, Philadelphia, architect, has plans under way for a three-story and basement automobile service, repair and garage building, to cost $125,000 with equipment.

The American La France Fire Engine Co., Elmira, N. Y., manufacturer of motor-driven fire-fighting equipment, has awarded a general contract to Franklin M. Harris & Co., 1520 Parrish Street, for a one-story factory branch and service building at Twenty-fifth and Westmoreland Streets, to cost close to $100,000 with equipment.

The Victor Talking Machine Co., Camden, N. J., is advancing production at its plant for the new orthophonic machines and parts. Plans have been authorized for a new branch plant in Spain, to be equipped for three times the output of an existing works. The Gramophone Co., Ltd., Hayes, Middlesex, England, a subsidiary, has acquired additional buildings in the vicinity of its plant for increased output. Arrangements have also been completed for a new plant in Germany. E. E. Shumaker is vice-president; Walter J. Staats is treasurer and head of the foreign trade division.

Charles A. Cogan, receiver for the John M. Rogers Works, Inc., Monmouth Street, Gloucester City, N. J., manufacturer of tools, airplane parts, etc., is arranging for the sale of the machine shop and property of the company.

The Norristown Borough School Board, Norristown, Pa., will soon take bids for remodeling a building at Church and Oak Streets, for a new two-story vocational school, 50 x 75 ft., to cost $50,000. E. Lane Crawford, Curran Arcade, is architect.

The Red Lion Borough School Board, Red Lion, Pa., is considering the installation of manual training equipment in a proposed new junior and senior high school to cost about $150,000, for which plans will be prepared by Clayton J. Lappley, Parkside Building, Harrisburg, Pa., architect.

The City Council, Reading, Pa., is planning for additions to the municipal pumping plant used for the sewage system, to cost close to $450,000 with machinery. A bond issue of $560,000 will be arranged.

The U. T. Hungerford Brass & Copper Co., Lafayette, White and Franklin Streets, New York, has removed its Philadelphia warehouse to 46 North Sixth Street, corner Filbert Street, that city, where with increased stock and larger facilities, it will better be able to serve the Philadelphia district.

The Landis Tool Co., Waynesboro, Pa., has appointed the Syracuse Supply Co., Syracuse, as its selling agent in northern New York, and the Seifreat-Elstad Machinery Co., Dayton, as agent in southern Ohio. Otherwise the company will continue its policy of selling by means of its own representatives. R. F. Ingram is sales manager of the Landis Tool Co.

## New England

BOSTON, Sept. 13.

WITH plants getting into fall production schedules slowly, comparatively little interest is manifested in machine tools. Some old inquiries, however, are still active and with those received since Sept. 1, local machine tool dealers anticipate an improvement within the next few weeks, when, it is expected, considerable business will be placed with 1927 bill datings.

Many New England machine tool manufacturers are more or less busy on special equipment for automobile manufacturers in the Middle West, but are well cleaned up on equipment required in the East. Deliveries on tools made in the Middle West, last week reported as backward, have improved. One of the most active local dealers states that August showed a deficit, the first loss since September, 1925.

Fay, Spofford & Thorndike, 44 Bromfield Street, Boston, engineers will have plans ready about Oct. 18, for a Gloucester, Mass., pumping station.

The Horton Mfg. Co., Bristol, Conn., has awarded contract to the Torrington Building Co., for a one-story manufacturing unit.

The Westinghouse Electric & Mfg. Co., West Springfield, Mass., has started the erection of a two-story, 80 x 80 ft. pattern shop and drafting unit.

Charles H. Abbott, Inc., Hartford, Conn., with a capital of $100,000 has incorporated under the laws of that State to manufacture steel bearings, burnishing implements and metallic burnishing materials. Charles H. Abbott, West Hartford, is president.

The Brownell Machinery Co., Providence, R. I., has been appointed exclusive agent for the Cleveland Planer Co., Cleveland, in the State of Rhode Island, Bristol County, Mass., and New London and Windham Counties in Connecticut.

Control of the George W. Dunham Co., Utica, N. Y., manufacturer of washing machines, has been acquired by the Winchester Repeating Arms Co., New Haven, Conn. The Utica company will remain as a separate corporation with George W. Dunham directing head, and James McClymount sales manager, but all equipment will be moved from Utica to New Haven.

The Thomson Electric Welding Co., 261 Pleasant Street, Lynn, Mass., manufacturer of electric welding equipment, has completed plans for a one-story addition to cost about $45,000 with machinery. H. M. Haven and A. T. Hopkins, 11 Beacon Street, Boston, are engineers.

The Strand & Sweet Mfg. Co., Meadow Street, Winsted, Conn., manufacturer of electrical wires, magnet wire, etc., has awarded a general contract to Willis E. Hart, Winsted, for its two-story addition, 50 x 85 ft., to cost about $45,000 with equipment. Mylchreest & Reynolds, 238 Palm Street, Hartford, Conn., are architects and engineers.

## The Crane Market

INQUIRY for overhead cranes continues light and only a moderate volume of business is reported under negotiation. Railroads are showing slightly more activity in the locomotive crane field, an outstanding list being that of the New York Central, which has added one more item, a combination locomotive crane and pile driver of 25 tons capacity. This brings the total number of separate inquiries issued to seven, two crane pile drivers, four standard locomotive cranes and one crawl-tread. Of this number a 10-ton, 8-wheel crane is understood to have been closed by taking over a used machine from a contractor and it is believed that one of the crane pile drivers is a revision of an earlier inquiry, so that the total outstanding is five or six items. The Jones Construction Co., Woodlawn, Pa., is inquiring for a new or used 10-ton, 40-ft. boom, bucket handling crawl-tread crane.

Among recent purchases are:

Stone & Webster, Inc., Boston, three 3¾-ton, 28-ft. 11½-in. span overhead cranes with three 1¼-ton trolleys each, for the American Sugar Refining Co., Brooklyn, N. Y., from the Milwaukee Electric Crane & Mfg. Co.

Automatic Machine Co., Bridgeport, Conn., a 5-ton, 30-ft. span, electric crane and a 3-ton electric monorail hoist from the Northern Engineering Works.

Mitsui & Co., 65 Broadway, New York, two 3-ton, 3-motor, monorail hoists for export to Japan, from the Northern Engineering Works.

Lock Joint Pipe Co., Orange, N. J., a 7½-ton, 40-ft. span, 3-motor overhead crane from the Shepard Electric Crane & Hoist Co.

International Paper Co., 100 East Forty-second Street, New York, a 100-ton crane trolley for Canada, reported purchased from the Northern Crane Works, Ltd.

Eastman Kodak Co., Rochester, N. Y., a 25-ton locomotive crane from the American Hoist & Derrick Co.

American Creosoting Co., Louisville, Ky., a 25-ton locomotive crane from the American Hoist & Derrick Co.

W. P. Brown & Sons Lumber Co., Louisville, Ky., a 12-ton, 8-wheel locomotive crane from the American Hoist & Derrick Co.

Fluck Cut Stone Co., Chicago, a 7½-ton, 50-ft. span overhead electric crane from the Northern Engineering Works.

Chicago, sanitary district, a 3-ton electric monorail hoist with grab bucket and rail, through O. J. Abell & Co., Chicago, from Alfred Box & Co.

The Beacon Oil Co., 111 Devonshire Street, Boston, has acquired the former shipyard of the Morgan Iron Works, New London, Conn., and will remodel for a new oil storage and distributing works, to cost about $150,000 with equipment.

J. D. Marr, 384 Dorchester Avenue, Boston, architect, has plans under way for a one and two-story automobile service, repair and garage building at South Boston, 200 x 200 ft., to cost $185,000 with equipment.

The Arlington Gas Light Co., 689 Massachusetts Avenue, Arlington, Boston, has plans for the construction of a one-story gas generating station and boiler plant to cost about $80,000. W. M. Russell, 77 Franklin Street, Boston, is architect.

The Haverhill Box Board Co., Haverhill, Mass., is said to have preliminary plans for rebuilding the portion of its plant recently destroyed by fire, with loss reported at close to $100,000 including equipment.

The Grant Mfg. & Machine Co., Silliman Avenue, Bridgeport, Conn., has awarded a general contract to the W. R. Muirhead Co., Bridgeport, for a one-story addition, 40 x 65 ft.

## Buffalo

BUFFALO, Sept. 13.

BIDS will soon be asked by the Ritter Dental Mfg. Co., 404 West Avenue, Rochester, N. Y., manufacturer of dental chairs, instruments, etc., for a one-story foundry, 62 x 140 ft., to cost about $40,000. Foote & Carpenter, Temple Building, are architects.

The Irving Air Chute Co., 760 Main Street, Buffalo, manufacturer of parachutes, has completed plans for the establishment of a branch factory at Letchworth, England. Leslie Irvin, Buffalo headquarters, is now abroad to supervise the new plant. George Waite is president.

The United States Radiator Corporation, Wright Street, Dunkirk, N. Y., is said to be planning for a one-story addition to cost in excess of $45,000 with equipment.

The St. Joseph Lead Co., 250 Park Avenue, New York, with main works at Bonne Terre, Mo., has concluded negotiations for the purchase of the properties of the New York Zinc Co., Inc., near Watertown, N. Y., comprising more than 7500 acres of mineral lands. The new owner will take immediate possession and is said to be planning for early development and operation.

The Parker White Metal & Machine Co., Twenty-third Street, Erie, Pa., has preliminary plans for a three-story addition, 60 x 100 ft., to cost $37,000. W. A. Parker is general manager.

The Sylvanite Mines, Ltd., Edward L. Kooms, 110 Franklin Street, Buffalo, president, is arranging for the early construction of a new mill at its gold mining properties at Kirkland Lake, Ont., to cost more than $100,000 with machinery, filters, tanks, etc. Orders for equipment are being placed.

The Pierce Arrow Sales Co., 784 Main Street, Buffalo, has awarded a general contract to C. H. Everitt, 295 Auburn Avenue, for its proposed two-story service, repair and garage building, 120 x 125 ft., to cost $150,000. Harold J. Cook, 438 Delaware Avenue, is architect.

## Chicago

CHICAGO, Sept. 13.

THE activity shown in the machine tool market a week ago was short lived, and the second week in September closed with little to encourage dealers. A fair amount of inquiry is before the trade, but the center of interest is the pending list of the Illinois Steel Co., which has not been acted upon. In many cases prospective buyers state that they will not make purchases until they have had an opportunity to visit the machine tool exposition to be held Sept. 20 to 24 at the Municipal Pier, Chicago. This leads some dealers to look for a dull market until the show is closed. An agricultural machinery maker at Moline, Ill., has bought a 16-in. shaper. Used tools are in fair demand, but are not so active as last month.

Pete Hanson, Chicago Heights, Ill., plans the construction of a machine shop, 60 x 100 ft.

The International Steel Co., 3936 South Lincoln Street, Chicago, will build a one-story brick warehouse, 180 x 270 ft., to cost $40,000. S. Scott Joy, 2001 West Pershing Road, Chicago, is architect.

John K. Neebe, 3713 North Kedvale Avenue, Chicago, will build a two-story foundry to cost $25,000.

The International Harvester Co., 606 South Michigan Avenue, Chicago, will erect a one-story brick and steel carbonizing building, 73 x 144 ft.

The Pullman Co., Chicago, will construct several factory buildings on the east side of Langley Avenue between 111th and 115th Streets, to cost $1,000,000. A. J. T. Bennett, 38 South Dearborn Street, Chicago, is the architect.

The Mineralac Electrical Co., 1618 Arcade Place, Chicago, manufacturer of electrical specialties, will build a one-story factory, 94 x 104 ft., to cost $35,000. H. V. Von Holst, 57 West Jackson Boulevard, Chicago, is the architect.

The Nye Tool & Machine Co., 4130 Fullerton Avenue, Chicago, will erect a one-story addition, 100 x 100 ft. Mundie & Jensen, 39 South LaSalle Street will receive bids.

The Chicago Solder Co., 4201 Wrightwood Avenue, Chicago, has awarded a general contract to the Schmidt Brothers Construction Co., 32 East Huron Street, for a one-story addition, to cost $50,000 with equipment. Frank Englehart is president and treasurer.

The Board of Education, Eveleth, Minn., contemplates the installation of manual training equipment in its proposed two-story senior high school addition, to cost $300,000, for which superstructure will soon begin. Edwin H. Berg, 405 Jones Street, Eveleth, is architect.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded a general contract to N. H.

McRae, Chicago, for a one-story addition to its plant at 2600 West Thirty-first Street to cost about $100,000. D. W. Price is company architect, address noted.

The Royer Mfg. Co., Janesville, Iowa, manufacturer of concrete mixers and kindred machinery, has plans for a one-story addition, 40 x 120 ft., to cost about $35,000 with equipment.

Fire, Sept. 1, destroyed a portion of the plant of the Griffin Wheel Co., Stillwater and Phalen Avenues, St. Paul, Minn., with loss reported at close to $150,000 including equipment. Headquarters are at 410 North Michigan Avenue, Chicago.

The Independent Can Co., Chicago, has leased the two one-story buildings at 1328 West Monroe Street for expansion.

The Chevrolet Motor Sales Co., 205 Underhill Avenue, Peoria, Ill., has plans for a two-story service, repair and garage building, 80 x 175 ft., to cost close to $100,000 with equipment. B. L. Hulsebus, Jefferson Building, is architect.

The Bristol Co., Waterbury, Conn., manufacturer of recording pressure gages, thermometers, pyrometers, etc., has opened a branch sales and service office in the United States National Bank Building, Denver, Colo., in charge of H. T. Weeks.

Hughes & Graul, Chicago, in addition to representing in the western district the Ohio Steel Foundry Co., Lima, Ohio; the McConway & Torley Co., Pittsburgh, and the Davis Brake Beam Co., Johnstown, Pa., will represent the Power Piping Co., Pittsburgh.

## Cincinnati

CINCINNATI, Sept. 13.

BUSINESS continues dull in the local machine tool market, and there are no signs of an immediate recovery. Inquiries have fallen off to some extent, while buyers are hesitant about closing for equipment until they view the tools on exhibition at Chicago next week. Local builders are of the opinion that there will be a sharp upward trend in sales about Oct. 1. There are increasing signs of a revival of buying by the automotive industry, but business from that source thus far has been only fair at best. Railroads are only a minor factor, their purchases being confined to a few scattered machines. The Delco Light Co., Dayton, Ohio, which now is building large additions to expand its manufacturing facilities, probably will be an active buyer in the next two months. It is considering the purchase of a number of tool room lathes as well as other equipment.

Sales of electrical tools have held up fairly well in the past month. There has been an increase in orders for drilling machines, while the demand for lathes is light. A local turret lathe manufacturer reports good business in the first half of September. Boring mill builders state that sales have been slow, but prospects are excellent. Bookings of heavy railroad and industrial equipment have been below normal.

Among the sales in the past week are the following: Chevrolet Motor Co., St. Louis, a Cincinnati Hy-Speed drill; Sacramento school district, Sacramento, Cal., a universal motor-driven milling machine; a San Diego, Cal., company, a Ransom grinder, 16-in. x 8-ft. lathe and an 18-in. x 12-ft. geared-head lathe; Charles Kaufman & Sons, Santa Ana, Cal., a Brown & Sharpe No. 6 screw machine; Wisconsin Public Service Corporation, Green Bay, Wis., a Cox motor-driven pipe machine.

The Ironton Bernhard Boiler Co., Ironton, Ohio, has been incorporated with capital stock of $120,000 and has succeeded to the business of the Bernhard Boiler Mfg. Co. The new company has leased a modern foundry in Ironton and will manufacture cast iron sectional heating boilers, known as the Bernhard triple combustion boilers. New machinery will be installed within the next few weeks and production will be started as soon thereafter as possible. The officers of the Ironton Bernhard Boiler Co. are: President, J. B. Bernhard, former president the Bernhard Boiler Mfg. Co., Cleveland; first vice-president, Carl E. Froelick, sales director Ironton Stove & Mfg. Co., Ironton; second vice-president, Charles Horn, president First National Bank, Ironton; secretary, Walter L. Henry, merchant of Ironton; treasurer, C. B. Egerton, cashier, Iron City Savings Bank, Ironton; chairman of the board, A. L. Garford, president Cleveland Automatic Tool Co., Cleveland; director, W. P. Lewis, cashier Citizens National Bank, Ironton.

The International Harvester Co., Chicago, has awarded a general contract to R. H. Evans, Atlas Building, Columbus, Ohio, for a one and four-story and basement factory branch and service building, 92 x 135 ft., at Columbus, to cost approximately $200,000 with equipment. W. P. Price is company architect.

The Wakenva Coal Co., operating near Hazard, Ky., plans the rebuilding of its tipple, partially destroyed by fire, Aug. 28, with loss reported at $50,000 including equipment.

H. G. Crockett, Kingsport, Tenn., has plans for a one-story machine shop, 35 x 60 ft., to cost about $20,000 with equipment.

The Cumberland Portland Cement Co., Cumberland, Md., is completing plans for a new mill at Cowan, Tenn., to cost in excess of $900,000.

Fire, Aug. 30, destroyed a portion of the plant of the Ripley Oil Mills, Ripley, Tenn., with loss estimated at $40,000 including equipment. It is planned to rebuild. G. L. Rice heads the company.

The city service director, Troy, Ohio, has been authorized to take bids for equipment for the municipal waterworks, including two pumping units and one 500,000 gal. capacity steel standpipe.

The Board of Education, 270 East State Street, Columbus, Ohio, is said to be planning for the installation of manual training equipment in a proposed three-story and basement McKinley junior high school in the Cleveland section, estimated to cost $400,000. Howard Dwight Smith is architect for the board.

## Detroit

DETROIT, Sept. 13.

THE Norton Co., Worcester, Mass., manufacturer of abrasive materials, will soon ask bids on a general contract for a two-story factory branch and distributing plant at Trumbull and Lincoln Avenues, Detroit, to cost $55,000. Frost, Chamberlain & Edwards, 390 Main Street, Worcester, are architects.

Charles E. Bohn, Lansing, Mich., acting as trustee for a group of creditors of the Iron Castings Co., operating the local Ryan-Bohn Foundry, has acquired the plant at a foreclosure sale for $328,000. The new interests are said to be planning resumption of production.

The Leonard Refrigerator Co., Grand Rapids, Mich., has awarded a general contract to the Austin Co. for a one-story addition, 248 x 400 ft., to cost about $250,000.

The Board of Education, Royal Oak, Mich., is considering the installation of a manual training department in its proposed two and three-story senior high school to cost $850,000, for which bids will be asked on a general contract this month. F. D. Madison, State Bank Building, Royal Oak, is architect.

The General Foundries, Inc., Flint, Mich., recently formed with a capital of $150,000, has begun the construction of the first unit of a proposed plant, totaling 30,000 sq. ft. of floor space, to cost $135,000 with equipment. A general contract for the structure was recently let to the Utley Construction Co., Flint. The foundry will specialize in the production of gray iron and semi-steel castings. The new company is headed by C. W. Bonbright, W. E. Fellows and J. M. Barringer, all of Flint.

The Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, has awarded a general contract to the Otto Misch Co., 159 East Columbia Street, for a one-story addition to its die shops to cost in excess of $50,000. Albert Kahn, Marquette Building, is architect.

The Harotto Appliance Co., Lansing, Mich, recently organized by Otto J. Kirchen and E. Harold Schetzer, both of Lansing, is completing plans for the operation of a new plant for the manufacture of a patented oil heater.

The General Aircraft Corporation, Detroit, now being organized by Clifford C. Jones, Detroit, and associates, is planning the early establishment of a new plant for the manufacture of airplanes of seven-cylinder design, developing 300 hp.

The Consumers Power Co., Jackson, Mich., has plans for an addition to its steam-operated electric power house at Kalamazoo, Mich., to cost in excess of $1,000,000 with equipment.

The Bay City Electric Steel Casting Co., Bay City, Mich., is completing an addition to its foundry on Trumbull Street, which provides about 2000 sq. ft. additional floor area.

The Vinco Tool Co., 407 East Fort Street, Detroit, has awarded a general contract to Leto Brothers, 1432 St. Aubin Avenue, for its one-story addition, 50 x 90 ft., to cost $35,000 with equipment. Ralph A. Putnam is head.

The Flint Structural Steel Co., Flint, Mich., formerly subsidiary of the Massillon Bridge & Structural Co. of Massillon, Ohio, was recently incorporated as a separate company. Officers of the Flint Structural Steel Co. are Reinhard Kleinpell, president; Arthur G. Bishop, vice-president; R. W. Heerlein, treasurer and general manager, and E. H. Perkins, secretary and chief engineer.

## South Atlantic States

BALTIMORE, Sept. 13.

PLANS are being arranged by the Schock Independent Oil Co., Mount Joy, Pa., for the construction of a new storage and distributing works on 23-acre tract near the Marine Terminal, Wilmington, Del., recently acquired. Clarence Schock is president.

The Avalon Sand & Gravel Co., 431 North Front Street, Baltimore, is planning the purchase of a derrick, electrically-operated boom, 75 ft. or longer, with three-drum engine and complete accessories.

The Norfolk & Western Railway Co., Clyde Cooke, purchasing agent, room 351, N. & W. Railway Building, Roanoke, Va., is asking bids until Sept. 22 for requirements of couplers and parts from Oct. 1 to Dec. 31, 1926, contract serial AA-428; for requirements for locomotive steel tires for the same period, contract serial AA-429; for wrought steel pipe, contract serial AA-430, and for 2000 tons steel shapes, plates and bars, contract serial AA-431.

The Marlbrook Lime Co., First National Bank Building, Roanoke, Va., plans the purchase of a steam shovel, revolving type, about ¾-yd. capacity bucket; also a jaw crusher, about 24 x 36 in.

The Atlantic Ice & Coal Corporation, Atlanta, Ga., is planning the early rebuilding of the portion of its ice-manufacturing plant destroyed by fire Sept. 7, with loss in excess of $200,000 including equipment.

The Chesapeake Mfg. Co., Barre and Sharp Streets, Baltimore, manufacturer of furniture, has acquired property at 125 West Barre Street, 50 x 150 ft., and plans the construction of a new multi-story factory, to cost more than $70,000 with machinery.

The City Council, Waycross, Ga., has authorized the complete electrification of the municipal waterworks. New equipment will be installed.

The Ware County Light & Power Co., Waycross, Ga., has tentative plans for a new ice-manufacturing plant to cost approximately $120,000 with machinery. The equipment will be electrically operated. The company is also reported to be planning the early construction of a new power house in the vicinity of Folkston, Ga., where a franchise has been secured.

The Tredegar Co., foot of Fifth Street, Richmond, Va., manufacturer of brass castings, etc., has filed plans for a one-story extension to cost about $17,000.

The Tallassee Power Co., Badin, N. C., has plans for a new hydroelectric generating plant on the Yadkin River, vicinity of Albemarle, N. C., to cost close to $300,000 with transmission system. The Southern Power Co., Charlotte, N. C., is interested in the project.

The Savannah Electric & Power Co., Savannah, Ga., has called a special meeting of stockholders on Oct. 7 to arrange for an increase in capital from $1,800,000 to $2,300,000 preferred stock, and common stock from 100,000 to 200,000 shares, no par value. Of the latter issue, a total of $600,000 will be sold, the proceeds to be used in connection with an expansion program now under way. The entire project will represent an investment of $2,300,000. The company is under the direction of the Engineers' Public Service System, a subsidiary organization of Stone & Webster, Inc., 147 Milk Street, Boston.

The Queen City Ice Co., Charlotte, N. C., has tentative plans for a new plant at East Seventh and Davidson Streets, to cost close to $40,000 with machinery. The company recently acquired the local plant of the Charlotte Ice Co., and will continue operations.

The Board of Education, Baltimore, is considering the installation of manual training equipment in its proposed three-story and basement high school at Pulaski Street and Gwynns Falls Parkway, estimated to cost $1,000,000, for which bids have been asked on a general contract. H. F. Doeleman, 507 North Charles Street, is engineer; J. E. Sperry, Calvert Building, is architect.

The Hackley-Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a portable punch, capable of punching holes up to ¼-in. diameter; also for a shearing machine and air hammers, Boyer type preferred.

The Southeastern Power & Light Co., Birmingham, operating the Alabama Power Co., and other large electric utilities, has completed negotiations for the purchase of the Rome Railway & Light Co., Rome, Ga., and will operate in conjunction with other properties. Extensions are planned in the Rome district, including transmission line construction.

The White Furniture Co., Mebane, N. C., will begin superstructure for a new three-story and basement plant, 80 x 175 ft., to cost approximately $75,000 with machinery. J. E. White is general manager.

The Kuhlman Electric Co., Bay City, Mich., manufacturer of Kuhlman power, distribution and street lighting transformers, has opened a direct factory branch office at 411 Glenn Building, Atlanta, Ga., in charge of Ernest K. Higginbottom.

J. T. Stephenson, Munsey Building, Washington, has been appointed selling agent for the products of the Logan Iron & Steel Co., Philadelphia, in the Baltimore territory and as far south as Atlanta, Ga.

## Indiana

INDIANAPOLIS, Sept. 13.

WORK will soon begin on an addition to the plant of the Bowers Seal Fast Corporation, 650 North Meridian Street, Indianapolis, manufacturer of automotive specialities, to be two-stories and basement, 50 x 90 ft., estimated to cost $30,000. The Ostrom Realty & Building Co., Peoples Bank Building, is architect.

The Kelly Axe & Tool Co., Charleston, W. Va., has plans for a one-story storage and distributing plant, 130 x 180 ft., and barge terminal, 200 x 400 ft., at Evansville, Ind., to cost in excess of $100,000 with equipment. The project will be carried out by the Kelly Barge Line, a subsidiary. A. J. Lapsley is company engineer. Three traveling cranes will be installed.

Harry Warriner, 673 Broadway, Gary, Ind., architect, will soon take bids for a three-story and basement automobile service, repair and garage building, 120 x 120 ft., to cost approximately $250,000 with equipment.

The Standard Oil Co., Evansville, Ind., has plans for extensions in its oil storage and distributing plant to cost about $50,000 with equipment.

M. E. Smith, 323 Main Street, South Bend, Ind., architect, has plans for a three-story automobile service, repair and garage building, 66 x 165 ft., to cost about $100,000 with equipment

The Jeschke Wire Specialty Works, Crawfordsville, Ind., has been purchased by Woodard G. Jeschke, who for the past five years has been manager of the Campbell Wire Specialty Works at South Bend, Ind. The Jeschke works are moving into a larger and more modern plant at Crawfordsville.

## Gulf States

BIRMINGHAM, Sept. 13.

BIDS will soon be asked by the McWane Cast Iron Pipe Co., 3600 Eleventh Avenue, North, Birmingham, for a two-story addition, 50 x 150 ft., to cost close to $50,000. Warren, Knight & Davis, Empire Building, are architects.

The Board of Trustees, University of Texas, Austin, Tex., is planning an early call for bids on general contract for its proposed central steam-operated electric power plant, to cost about $250,000 with equipment. The Herbert M. Greene Co., Santa Fe Building, Dallas, Tex., is architect.

The Central Texas Power & Light Co., Frost Building, San Antonio, Tex., is said to be planning extensions in the former municipal power plant at Wellington, Tex., recently acquired. Transmission lines will be extended.

The Baker-Geib-Schaub Motor Co., Fort Lauderdale, Fla., is having plans drawn for a one and two-story service, repair and garage building, 100 x 140 ft., reported to cost close to $100,000 with equipment. John M. Peterman, 346 Las Olas Boulevard, is architect.

The Plains Pipe Line Co., Wichita Falls, Tex., is reported to be planning for extensions in its pipe lines. It has recently increased its capital from $100,000 to $200,000 for expansion.

The Cunningham Machine Works, 1529 Texas Avenue, Shreveport, La., has inquiries out for an open-side planer, medium size; also for a 4-ft. radial drill press, and a 20-in. heavy-duty lathe, quick change type.

A. E. Dickson, 25 West Washington Street, Orlando, Fla., is desirous of getting in touch with manufacturers of broom-making machinery.

The City Council, Waco, Tex., plans the installation of pumping machinery in connection with the development of a new source of supply at Lake Bosque. The entire project is

expected to cost $3,500,000. A special election has been called to approve bonds in this amount.

The Kansas City Southern Railroad Co., Kansas City, Mo., is said to be considering the construction of an additional grain elevator at Port Arthur, Tex., to cost in excess of $500,000 with machinery.

The Florida East Coast Utilities, Inc., Johnson & Moffatt Building, Miami, Fla., has plans under way for a new cold storage and refrigerating plant, in conjunction with an ice-manufacturing plant with output of 200 tons per day. The entire project will cost in excess of $450,000. Ophuls & Hill, Inc., 112 West Forty-second Street, New York, is engineer.

The Board of Education, Huntsville, Ala., contemplates the installation of manual training equipment in a proposed new high school to cost $160,000, for which plans have been prepared by the R. H. Hunt Co., James Building, Chattanooga, Tenn., architect.

The Mississippi Central Power Corporation, care of Piper, Carey & Hall, Calvert Building, Baltimore, attorneys, J. Bannister Hall, Jr., same address, corporate representative, has been chartered under Maryland laws with capital of 1,000,000 shares of stock, no par value, assessed by the State on the basis of a capitalization of $100,000,000. The new company will construct electric power plants and systems in different parts of Mississippi and will take over existing properties. It is also proposed to construct ice-manufacturing plants.

The Turner-Coffield Co., 828 Franklin Avenue, Waco, Tex., is reported to be planning the construction of a new cold storage and refrigerating plant at Cisco, Tex., to cost in excess of $50,000.

The City Council, Baird, Tex., plans the installation of four or five vertical centrifugal pumps, direct-connected to motors, in connection with proposed extensions in the municipal waterworks. Koch & Fowler, Central Bank Building Dallas, Tex., are engineers.

## Milwaukee

MILWAUKEE, Sept. 13.

THE volume of business being booked by local machine-tool builders is of fair aggregate, but most orders are for single items from scattered sources. There is much activity in tool plants in completing new designs and types for the coming exhibition of the American Society for Steel Treating at Chicago, and some prospects are awaiting the opportunity of inspecting the machines before placing orders. Buyers as a rule, however, are those who need new equipment more or less urgently for current production.

The Chain Belt Co., 736 Park Street, Milwaukee, has let the general contract to the Dahlman Construction Co., 456 Broadway, Milwaukee, for the construction of an addition, 120 x 308 ft., to its Orchard Street works. The project is being supervised by Frank D. Chase, Inc., engineer, Chicago. C. Raymond Messenger is president.

The White Co., Cleveland, through H. Ralph Hadlow, branch engineer, will take bids after Sept. 15 or 20 for the erection of a new branch house in Milwaukee, 140 x 170 ft., part two stories, and cost about $250,000 with equipment. The Milwaukee branch of the White Co. now occupies leased quarters at 671 Kinnickinnic Avenue.

The American Electric Motors, Inc., 57 Erie Street, Milwaukee, has let contracts for the erection of a new plant, 100 x 300 ft., one story, at Cedarburg, near Milwaukee. The Saukville, Wis., Construction Co., has been given the general work and the steel work has been placed with the Milwaukee Bridge Co.

The Northern Furniture Co., Sheboygan, Wis., which is making improvements and additions, has let the contract for a dry room building, 85 x 103 ft., to the Borth Construction Co., Sheboygan. Bids will be closed Sept. 18 for a four-story manufacturing building, 110 x 200 ft., which will require considerable equipment, motors, etc. The architect is Edward A. Juul, Sheboygan.

The Board of Industrial Education, West Allis, Wis., will close bids Sept. 27 for the construction of the first unit of the new vocational training school, three stories, 65 x 105 ft. The architects are Robert A. Messmer & Brother, 221 Grand Avenue, Milwaukee. Samuel Moore, 457 Sixty-third Avenue, is president of the board.

The Wesley Steel Treating Co., 651 South Pierce Street, Milwaukee, will build a $25,000 addition, designed by Richard E. Oberst, architect, 128 Grand Avenue. The general contract has been let to E. G. Hansen, also of 128 Grand Avenue.

The La Crosse, Wis., Board of Education is considering plans by Merman & Skogstad, local architects, for the proposed addition to the Logan junior high and vocational training school, to cost about $240,000. It is planned to start work early in October.

## Cleveland

CLEVELAND, Sept. 13.

THE machine tool market improved the past week in volume of inquiry, but sales were light. A fair amount of business is pending in single machines and small lots and the trade looks for a gain in sales the latter half of the month. Quotations made on turret lathes before the new price advance are still bringing out some good orders. A Michigan automobile company during the week purchased 20 turret lathes from a Cleveland manufacturer.

The W. S. Tyler Co., Cleveland, has placed contract with the Dresser Co., the Arcade Building, for a two-story 100 x 106 ft. foundry addition.

Bids for a power house for the Boys' Industrial School, Lancaster, Ohio, will be taken Oct. 5. This school is under the Ohio Department of Public Welfare of which J. E. Harper, Columbus, is director. Herman B. Briggs, Hartman-Ohio Building, Columbus, is architect.

The city of Fostoria, Ohio, contemplates the erection of a sewage disposal plant at an estimated cost of $200,000.

The city of Cadiz, Ohio, contemplates the erection of a high school to include a manual training department. Charles W. Bates, 77 Twelfth Street, Wheeling, W. Va., is the architect.

The Vichek Tool Co., 3000 East Eighty-seventh Street, Cleveland, has placed contract for a one-story addition, 39 x 60 ft.

The American Crucible Products Co., Elyria, Ohio, has acquired the plant of the Hoffman Heater Co., Lorain, Ohio, and has moved into the new quarters which will provide three times its former floor space.

The Chain Products Co., 3924 Cooper Avenue, Cleveland, is having plans prepared for a two-story, 55 x 140 ft. addition. The Carter Richards Co., Engineers' Building, is the engineer and architect.

The Cleveland Switchboard Co., 2925 East Seventy-ninth Street, Cleveland, has awarded contract for a one-story addition, 30 x 140 ft.

A warehouse for the distribution of alloy steels has been opened at 7122 Quincy Avenue, Cleveland, by Super Steels, Inc., which will handle the products of the Central Alloy Steel Corporation, Massillon, Ohio. Chester E. Sinclair, formerly warehouse manager of the Betz-Pierce Co., Cleveland iron and steel jobber and later president and general manager of the Cleveland Laundryette Co., is president of the company, and James Farrell, secretary and treasurer.

The Manganese Steel Products Co., Bucyrus, Ohio, has been organized by Arthur Whitcraft and Norris Whitcraft, formerly of the Era Steel Co., Bucyrus, to handle manganese steel castings and ingots and other manganese steel products and malleable iron and gray iron castings.

## St. Louis

ST. LOUIS, Sept. 13.

PLANS are being considered by the Economy Electric Co., 1401 Agnes Street, Kansas City, Mo., manufacturer of electrical equipment, for a one-story addition, 37 x 45 ft. Scott Kennedy is president.

Fire, Sept. 1, destroyed a portion of the plant of the Medart Co., 3500 De Kalb Street, St. Louis, manufacturer of transmission equipment, with loss reported at $70,000 including machinery. Plans for rebuilding are under consideration.

The Oklahoma Natural Gas Corporation, Oklahoma City, Okla., organized under Maryland laws to take over the company of the same name, Kingwood Pipeline Co., Southern Gas Co., and the Okmulgee Gas Co., will consolidate the properties, and has plans under way for expansion, including pipe line construction. A bond issue of $6,000,000 is being sold, the proceeds to be used for the merger and extensions. R. C. Sharp is president.

The W. A. L. Thompson Hardware Co., 511-13 Kansas Avenue, Topeka, Kan., has leased a four-story and basement plant, 100 x 150 ft., to be erected at Third Street and Kansas Avenue, for which a general contract has been let to J. M. Leeper, 623 East Seventh Street, to cost $150,000.

The Columbian Steel Tank Co., 1601 West Twelfth Street, Kansas City, Mo., has plans for a one-story addition to its present four-story plant, to cost about $50,000 with equipment.

The Seven-Wall Garage Co., Planters Building, St. Louis, has awarded a general contract to the Mid-Continent Construction Co., Louderman Building, for a six-story, service, repair and garage building, 139 x 140 ft., to cost $240,000 with equipment.

The City Council, Grand Island, Neb., has preliminary plans for extensions and improvements in the municipal electric light and power house, including the installation of additional equipment. The Pillsbury Engineering Co., 2344 Nicollet Avenue, Minneapolis, Minn., is engineer.

The Kansas Electric Power Co., Lawrence, Kan., is arranging for a bond issue of $1,000,000, a portion of the proceeds to be used for extensions and equipment installation.

The St. Louis Coffin Co., 1821 Chouteau Avenue, St. Louis, has completed plans for a two-story addition, 50 x 126 ft., to cost close to $50,000 with equipment.

Following the recent purchase of the municipal electric power plant at Alamogordo, N. M., by G. M. Einhart, Roswell, N. M., and associates, the new owners have plans under consideration for the construction of a new steam-operated electric generating plant in this section, with transmission lines to Tularosa, La Luz and vicinity, to cost about $100,000 with equipment.

The St. Louis municipal waterworks will receive bids Oct. 26 for two high-pressure steam-driven centrifugal pumps, with a daily capacity of 30,0000,000 to 35,000,000 gal., two low-pressure pumps with daily capacity of 40,000,000 to 60,000,000 gal. and one low-pressure pump of 60,000,000 to 120,000,000 gal. capacity.

The Bakers' Equipment Co., 908 South Taylor Avenue, St. Louis, recently incorporated, has engaged in the manufacture of an automatic machine for use in bakeries.

The East Arkansas Lumber Co., Little Rock, Ark., will engage in the manufacture of a signal device for automobiles. J. W. Trieschmann is general manager.

## Pacific Coast

SAN FRANCISCO, Sept. 8.

PLANS are being arranged by the Southern California Edison Co., Los Angeles, for shops at 659 East Avenue 21, consisting of general machine repair works, 75 x 135 ft.; forge and blacksmith shop, 20 x 123 ft.; and general storage and distributing buildings, each one-story. The entire project will cost close to $50,000.

The Puritan Ice Co., Lompoc, Cal., has acquired property in the northwestern section of the town, and contemplates the erection of a one-story plant, to cost in excess of $40,000 including equipment.

The Big Lakes Box Co., Mount Shasta, Cal., is considering the rebuilding of the portion of its plant recently destroyed by fire, with loss estimated at $150,000 with machinery.

R. H. Orr, Corporation Building, Los Angeles, architect, has plans for a six-story automobile service, repair and garage building, 90 x 270 ft., to cost $200,000 including equipment.

The Kroehler Mfg. Co., 5111 Santa Fe Avenue, Los Angeles, manufacturer of furniture, has awarded a general contract to the Winter Construction Co., 2404 West Seventh Street, for a new three-story and basement plant, 170 x 200 ft., to cost about $250,000 with machinery. N. W. Aipaugh, 2404 West Seventh Street, is architect. The company also awarded a contract recently for the erection of a new factory at San Francisco to cost about $160,000.

The city of Seattle, municipal light and power department, has arranged for a bond issue of $2,000,000, a portion of the proceeds to be used for extensions.

The California Petroleum Corporation, Security Building, Los Angeles, has acquired a controlling interest in the International Refining Co., and the Northern Star Oil & Refining Co., both operating refineries in the vicinity of Sunburst, Mont., for $4,000,000. Plans are under way for expansion and the installation of additional machinery.

The Fairbanks Exploration Co., has started work on a new power house at Fairbanks, Alaska, the reported cost being about $1,750,000. It will not be completed before 1928.

The Puget Sound Bridge & Dredging Co., Seattle, has been given a contract for a two-story addition, 50 x 250 ft., to the plant of the Pacific Coast Paper Mills near Bellingham, Wash., to cost with equipment about $175,000.

Stockholders of the Inland Empire Paper Co., at Millwood, Wash., have approved plans for the erection of an addition to cost about $350,000. It will include an additional wood digester, 500-hp. boiler, grinder, new paper machinery and other equipment. The president of the company is Judson G. Rosebuch of Appleton, Wis.

Plans are being drawn for the first unit of a new plant for the Zellerbach Paper Co., Los Angeles, to be erected at Southgate. It will have 120,000 sq. ft. of floor space, of which 50,000 sq. ft. will be devoted to a folding paper box department and the remainder to a corrugated paper department. The investment will approximate $500,000, including equipment.

The Robinson Sales Co., Polson Building, Seattle, has been appointed sales agent in Washington and a large part of Oregon for the Roller-Smith Co., 233 Broadway, New York, maker of electrical instruments and circuit breakers.

## Pittsburgh

PITTSBURGH, Sept. 13.

THERE is still a feeling of optimism in the machine tool trade. Current orders are fairly numerous and running ahead of those at this time last year. Dealers are looking for some good business resulting from the expansion of the Gary tin plate works of the American Sheet & Tin Plate Co. Inquiries so far received on that project have been for the mills, drives and heavy equipment, but it is believed that shears and machine shop equipment will also be wanted. The Cyclops Steel Co., Titusville, Pa., is under new management, but plans have not been announced yet.

Contract has been awarded by the Westinghouse Electric & Mfg. Co., East Pittsburgh, to the Van Blarcom Co., Cleveland, for the addition to its Sharon, Pa., works, to be five stories, 70 x 220 ft. A one-story extension, 42 x 100 ft., will also be built.

The Board of Education, Fulton Building, Pittsburgh, plans the installation of manual training equipment in the proposed three-story and basement Herron Hill junior high school to cost $1,000,000, for which plans are being drawn by James T. Steen & Sons, Vandergrift Building, architects.

The Hookless Fastener Co., Meadville, Pa., is completing plans for its two-story and basement addition, to cost about $70,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, Cleveland, are architects.

The Pittsburgh School of Auto Engineering, Penn Avenue and Fancourt Street, Pittsburgh, has awarded a general contract to the Building & Industrial Construction Co., Pittsburgh, for a six-story addition, with machine and other departments, to cost close to $200,000.

The Corona Coal Co., Hepzibah, W. Va., is arranging for the immediate rebuilding of the portion of its tipple recently destroyed by fire. Additional machinery will be installed.

The Republic Bank Note Co., 2817 Forbes Street, Pittsburgh, manufacturer of paper products, has plans under way for a four-story factory and operating building, to cost about $300,000 with equipment.

The Wet Branch Mining Co., Inc., Thomas W. Arnette, Fairmont, W. Va., president, has disposed of a bond issue of $400,000, a considerable portion of the proceeds to be used for expansion in its coal properties and the installation of machinery.


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## Canada

TORONTO, Sept. 13.

MACHINE tool business in this district improved somewhat the past week. As a result of exhibits at the Canadian National Exhibition, which closed last Saturday, several good orders were received which helped to swell the volume of sales. Manufacturers are beginning to show more interest in the market, but many are withholding orders until after the general election on Sept. 14. Several new plants are under construction and a good demand for equipment on this account is looked for.

Thomas Foster, chairman of the Board of Control, Toronto, will receive bids until Nov. 2, for the supply and erection of a 1,500,000 Imperial gal. centrifugal sludge pump for the main sewage pumping station.

The Rutherford Milling Co., Blenheim, Ont., will rebuild its flour milling plant recently destroyed by fire with loss of $100,000. Complete equipment will be required.

Everett Crosby, Yarmouth, N. S., is completing arrangements for building a wood-working factory to replace one recently destroyed by fire and is interested in machinery.

The Hamilton By-Products Coke Ovens, Ltd., 20 Main Street, Hamilton, Ont., will install two boilers on Depew Street to cost between $50,000 and $75,000. Wade & Inglis, 58 Leeming Street, have the general contract.

Plans are being prepared by B. H. Tract Co., Philadelphia, for an addition to the plant of the Western Clock Co., Peterborough, Ont., to cost $10,000.

The Canada Wire & Iron Goods Co., 180 King William Street, Hamilton, Ont., will build an addition to its plant to cost $7,000. G. J. White, 165 Main Street, has the general contract.

### Western Canada

The East Kootenay Power Co., Fernie, B. C., will build a steam power plant on the Alberta side of the Alberta-British Columbia boundary line at Crow's Nest. The company plans to spend approximately $1,000,000 and has let contract to the Power Corporation of Canada, Montreal. The proposed plant will be an addition to the company's other hydroelectric plants in the Kootenay district at Bull River and Elko, B. C.

The McArthur Sawmill Co., Prince George, B. C., will start work immediately on the erection of large mills to cost $500,000.

## Foreign

THE Leipzig Overland Power Companies, Leipzig, State of Saxony, comprising the Leipzig Public Service Corporation and affiliated interests, has arranged with W. A. Harriman & Co., 39 Broadway, New York, for the sale of $3,000,000 in bonds, the proceeds to be used for extensions and improvements in power plants and system, as well as coal-mining properties.

A British company, capitalized at $650,000, has applied to the Government of Norway for a concession to use hydroelectric power from Glomsfjord Falls for operation of a proposed aluminum manufacturing plant to be established in this section. The American Consulate, Copenhagen, Denmark, H. Sorensen, commercial attaché, has information regarding the project.

In connection with a proposed fish-packing plant at Mar del Plata, Argentina, plans are under way for the installation of a by-products plant for the manufacture of fertilizer, oils, stearine, etc. A cold storage plant is also under consideration. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Argentina No. 42102; also at the American Consulate, Buenos Aires, Argentina, H. Bentley MacKenzie, commercial attaché.

The Andian National Corporation, Ltd., care of the National Bank of Commerce, New York, is arranging for the sale of stock in amount of $6,250,000, the proceeds to be used for extensions in the oil properties in Colombia, S. A., including additions to the present pipe lines. Ritchie H. Willis is secretary.

Plans are under way for the development of a hydroelectric power project on the Alberche River, Spain, in which the Government will give financial aid. It is purposed to utilize two waterfalls for a station with initial capacity of 50,000 hp. The power will be used in part for the electrification of the Madrid-Avila and the Madrid-Segovia sections of the Norte Railway Co., which is interested in the project. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Spain No. 42069; also at the American Consulate, Madrid, Spain, Charles H. Cunningham, commercial attaché.

## THE LAST WORD

*(Contributed by the Reader Service Department of the Iron Age Publishing Co.)*

*IF he is wasteful he gets a "ticket."* The Newport Rolling Mill Co. has reduced the number of accidents in its plant 87 per cent by establishing a "safety court" for the trial of safe code violators.

And now, why not an "economy court" for the trial of those found wasting materials—or time? The court should be composed entirely of employees, and the "judge" should be armed with charts showing material costs and the drain which wastefulness makes on profits.

A trial before the economy court would have a much more lasting effect than a more passionate but less impressive harangue by the offender's foreman.

—

Apropos of nothing at all, we quote some remarks by Thomas Drier on the subject of "Editors:"

> . . . If the editor likes people, his liking will manifest itself in his publication and people will find themselves liking that publication. The editor will attract to himself only those people who are in tune with him. *No small-minded editor will attract and hold big-minded readers.*

Our thanks to Ray D. Lillibridge for bringing it to our attention.

—

*The Iron and Steel Age is at an end!* This distressing news comes from Williamstown, Mass., where scientists assembled for the annual conference of the Institute of Politics. We are told that we are now in the Synthetic Age. But steel shares in the securities market are still holding their own.

—

Not content with spreading consternation among those who depend on the making and working of iron and steel for their bread and butter, the scientists threaten at any moment to release the power imprisoned in the atom. How the power company magnates must be tossing in their sleep these nights!

—

The man who loses his mental balance is soon placed where he can do no harm to himself or to others. But when a man loses his business balance and cuts his prices below the profit line, his contemporaries must suffer until economic death stops his unfair competition.

Some otherwise astute business men seem not to want to know their costs. In a recent address on this subject W. L. Churchill said:

> Many manufacturers abandon their costs systems simply because they find it impossible to sell at prices that their system indicates they should obtain. In most instances, this is due to competitors under-pricing from lack of complete and properly assembled information. One manufacturer frankly stated:
>
> "My cost system made me so nervous I couldn't sleep nights for thinking of the difference between prices I sold my goods for and what my system showed I should get, so I threw it out."

The multiplication table can not be cheated for more than a brief period. A. H. D.